ASHEVILLE - BUNCOMBE
TECHNICAL INSTITUTE

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ASHEVILLE - BUNCOMBE TECHNICAL INSTITUTE

340 Victoria Road
Asheville, N. C.

Catalogue of Courses
Day and Evening School

Volume 4
1966 - 1967

School Calendar

1966 - 1967

FALL QUARTER

Registration .... September 6 and 7, 1966
Classes Begin .... September 8
Classes End .... November 23

Total number of class days: 55
Thanksgiving Holidays—November 24 and 25

WINTER QUARTER

Registration .... November 28 and 29, 1966
Classes Begin .... November 30
Classes End .... February 24, 1967

Total number of class days: 55
Christmas Holidays—December 21 through January 1, 1967

SPRING QUARTER

Registration .... March 1 and 2, 1967
Classes Begin .... March 6
Classes End .... May 23

Total number of class days: 55
Easter Holidays—Good Friday, March 24
Easter Monday, March 27

SUMMER QUARTER

Registration .... June 5 and 6, 1967
Classes Begin .... June 7
Classes End .... August 23

Total number of class days: 55
Holiday—July 4

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ADMINISTRATION

I. E. Ready	Director, Department of Community Colleges
Ivan E. Valentine	Assistant Director of Vocational-Technical Programs
Monroe C. Neff	Assistant Director of General Adult Education Programs
Gordon B. Pyle	Assistant Director of College Parallel Programs

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ADMINISTRATIVE STAFF

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Harvey L. Haynes, B.S.Ed., M.A.Ed., W.C.C.	Director of Instruction
John W. Davis, B.S., M.A.Ed., Florida State University	Director of Student Personnel
Alwin T. Hansen, B.S., M.A.Ed., W.C.C.	Counselor
B. C. Adams, L.L.B., University of Alabama	Director of Evening Programs
J. B. Edwards, Jr., B.S.Ed., Berea College	Director of Extension
Tyrus West, B.S., Western Carolina College	Assistant Director of Extension
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James R. Winning, A.B., Clemson College	Coordinator of General Adult and Community Service Programs
Norris H. Bell, A.B., U.N.C.	Area Coordinator, Supervisory Development Training
O'Brien Brooks	Supervisor of Basic Adult Education
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Mrs. Jessie P. Goforth	Bookkeeper
Mrs. Patricia Farr	Bookkeeper
Mrs. Frances Johnson	Student Records
Mrs. Janivian Wilson	Secretary
Mrs. Helen Bowers	Cashier

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Mrs. Emma Pate	Extension Secretary
Patricia Tweed	Receptionist
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Mrs. Mary Medd	Library Assistant
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Peggy Dillard	Secretary, Jackson County Industrial Education Center
Myrtice Buchanan	Secretary, Jackson County Industrial Education Center
John A. Price	Resident Director, McDowell County Industrial Education Center
Mrs. Sally Patterson	Secretary, McDowell County Industrial Education Center
Holland McSwain	Resident Director, Tri-County Industrial Education Center
Mrs. Margie Zimmerman	Secretary, Tri-County Industrial Education Center
M. C. Nix	Resident Director, Haywood County Industrial Education Center
Mrs. Blanche Burnette	Secretary, Haywood County Industrial Education Center

FACULTY

A. CHASE AMBLER, JR.,
Instructor, Physics. B.S., N. C. State University

JAMES E. ANDERSON, JR., P.E.
Chairman, Chemical Engineering Technology, B.S., Wake Forest, B.Ch.E., N. C. State

BRUCE ARROWOOD,
Librarian, B.S.L.S Appalachian State Teachers College

ALBERT W. AWALD,
Chairman, Tool and Die, G.E. Tool and Die Apprenticeship, Erie, Pa., N. C. State University

W. CARROLL BRIDGES,
Chairman, Drafting and Design. Western Carolina College, N. C. State University

JAY CANTER
Instructor, Business, B.S.Ed., Appalachian State Teachers College

CLETUS H. CANTRELL,
Instructor, Radio and T.V., Temple University, Western Carolina Col.

B. STEVENS CREASMAN,
Chairman, Electronics, C.R.E.I., Western Carolina College, N. C. State University

RUTH G. DIGGES, R.N.
Instructor, Practical Nursing, Jackson Memorial Hospital School of Nursing

FANCHON F. FUNK,
Instructor, Related, B.S.Ed., M.A. Ed., Appalachian State Teachers Col.

THOMAS E. GAFFIGAN,
Instructor, Mathematics, B.S. Mathematics, Western Carolina College

RUTH W. GEDDINGS, R.N.
Instructor, Practical Nursing, Jewish Hospital Training School

N. EUGENE GOODE, Chairman, Data Processing Technology, A.B. University of North Carolina

HAROLD P. HAMRICK,
Instructor, Electronics, A.B., B.S.E.E. North Carolina State University

BURNICE E. HAYNES,
Chairman, Machine Shop, Morehead City Technical Institute, N. C. State University

JAMES B. HURLEY,
Chairman, Business Administration, A.B., Brown University

ROBERT H. ISRAEL,
Chairman, Diesel and Hydraulic Systems, G.M. Diesel Technical School, N. C. State University

ARLENE G. JORDAN, R.N.
Instructor, Practical Nursing, Abginton Memorial Hospital

JOHN D. LANE, Chairman, Mechanical Engineering Technology, B.S. M.E., N. C. State University

G. PAUL LENTJES, P.E.
Instructor, Related, B.S.E.E., University of Pittsburgh

JEWEL McDANIEL,
Instructor, Business, B.S., Montreat College

KATHRYN MORRIS,
Instructor, English, B.S.ED., M.A.ED., Western Carolina College

SARAH M. MORRIS,
Chairman, Secretarial, B.S.ED., Western Carolina College

W. C. MAULDIN, COL. U.S.A.F. (Ret.),
Instructor Business and Related, B.S., Military Academy, M.A. U.C.L.A., M.B.A., Harvard

CHARLES F. NOBLITT,
Chairman, Automotive, N.C. State University

ROBERT C. PARKER,
Chairman, Air Conditioning Refrigeration, Chicago Technical College

JAMES RHEA,
Instructor, Related, B.S.ED., N.C. State University

RONALD SLUDER,
Instructor, Business, B.S. Business Administration, Western Carolina College

STANS C. SLUDER,
Chairman, Welding, Holbart Welding School, N.C. State University

LOWELL SMITH,
Instructor, Mathematics, B.S.ED., Western Carolina College

ROBERT SWAN,
Instructor, Machine Shop, N.C. State University

CAROLE H. TOWERY, R.N.
Instructor, Practical Nursing, Rutherford Hospital School of Nursing

RICHARD WHITE,
Instructor, Related, B.S. Business Administration, Western Carolina College

OLIN R. WOOD,
Instructor, Mathematics and Data Processing, B.E.Ed., M.A.Ed., Western Carolina College

JOHN W. WOODY,
Chairman, Carpentry and Cabinetmaking, Mars Hill College, N. C. State University

FOREWORD

Recent advancements in atomic energy, automation, guided missiles, and the advancing era of the push button are the results of the engineer working hand-in-hand with the technician and the skilled tradesman.

It is believed by many that our civilization, as well as our national defense, is dependent upon technology. The need for men and women with trade and technical skill grows more acute as time passes. To provide the type of education so necessary for future scientific advances, industrial progress, and national defense, The Asheville-Buncombe Technical Institute offers a variety of programs, both day and evening, designed to meet the needs of youth and adults of Western North Carolina.

Thomas W. Simpson
President

HISTORY, LOCATION, AND PURPOSE

In 1957 the North Carolina State Legislature made possible a program of increased technical training through the formation of Industrial Education Centers. It was felt if North Carolina was to achieve its rightful position in the expanding industrial and technological era, well equipped training centers would be needed to prepare the youth of today to meet the demands of present industry and industries that will locate in our state in the future.

After thorough surveys, both state and local, and a complete analysis of the present needs and future trends of technical and industrial training, Asheville was selected as one of the twenty locations for Industrial Education Centers.

In 1959 the people of the City of Asheville and County of Buncombe approved in a bond election $300,000 to be used in the construction of two buildings.

The spring of 1963 brought on the first major expansion of facilities. A third building was approved and a $200,000 loan from the State Literary Fund to the County was made possible. An individual board of trustees was appointed to meet the requirements of the new law passed in the summer of 1963. The new law removed the Center from the State Department of Public Instruction and placed it under the direction of the newly created Department of Community Colleges. The board of trustees requested that the Asheville center be made into a technical institute. This request was approved by the State Board of Education in January, 1964, and the name of the center was changed to Asheville-Buncombe Technical Institute.

LOCATION

The Asheville-Buncombe Technical Institute is located in three modern buildings on a twenty-one acre tract of land off Victoria Road. The entire 50,000 square feet of floor space is specifically designed to house a Trade and Technical program. Included in the buildings are well-lighted classrooms, large laboratories and shops equipped with the most recent test and production type equipment.

PURPOSE

The purpose of the Institute is to provide Trade and Technical training for qualified students, both youth and adult. The program is designed to impart profitable skills to the untrained or increase the knowledge of those already trained. The Institute will serve the principal objective to prepare students through practical training to meet the demands of a modern industrial society.

PROGRAMS OF STUDY

TECHNICAL DIVISION

Courses offered in the technical division are designed to meet an increasing demand for high level industrial skills in North Carolina. Students entering the Technical division are required to meet educational and aptitude standards appropriate to the course chosen. Such standards require a firm educational base and a level of maturity expected of adults.

Students who successfully complete courses in this division will be prepared to offer prospective employers the training, knowledge, and skill necessary to work as an Industrial Technician. More time will be required to attain such a degree of proficiency than would be necessary in the less exacting trade courses. Applicants for the technical division will therefore be urged to enroll for the full-time program.

TRADE DIVISION

Courses in the trade division place emphasis on training in those manipulative and mental skills applicable to the particular curriculum in which the student is enrolled. Students work under close supervision to obtain skills on a level acceptable to industry.

EVENING PROGRAMS

In addition to the full-time programs offered during the day, most of the same curricula are offered on a part-time basis in the evening. These classes meet Monday through Thursday for a total of fifteen hours a week.

Students who enroll in these programs generally work at full time jobs during the day.

Upon successful completion of these evening courses, the A.A.S. degree is conferred in the technical areas while a diploma is awarded in the trade areas.

EXTENSION DIVISION

The extension division provides avenues of learning to students attending classes at locations other than the Institute. Included in this division are extension units at Sylva, Marion, Haywood, and Murphy offering pre-employment training in various trade areas. Available at the Sylva unit are automotive mechanics, the masonry trades, carpentry, secretarial training, and drafting. The Marion unit provides automotive mechanics, drafting, and secretarial training. As of this printing the Murphy unit is in the formative stage, with plans for specific curriculum areas incomplete.

In addition to the offerings in the extension units numerous short term courses are provided for men and women who though employed, seek to upgrade, update, and generally enhance their individual knowledge and performance. Also available are supervisory-level courses designed to stimulate those individuals who aspire to advance their knowledge in the fields of management, and firemanship training for volunteer-firemen concerned with improving their skill.

Training for new and expanding industry constitutes an important segment of the extension division. In cooperation with the industry involved workers may be trained for specific occupational areas.

TOURIST INDUSTRY TRAINING

The latest studies available regarding the Tourist Industry show that total receipts from this industry in North Carolina in 1963 amounted to 968 million dollars, provided jobs for 83,300 persons, and contributed 173 million dollars in tax monies to the state.

It is predicted in 1974, this business will reach the two billion dollar mark and by 1984 will be in excess of three billion dollars.

In order to properly train the Tourist Industry to handle their duties more efficiently, the Asheville-Buncombe Technical Institute through the Extension Division offers the following courses:

Motel-Hotel Management Courses, Waitress Training, Housekeeping, Cooking Schools, and Tourist Information classes.

All Motel-Hotel Management courses are conducted in conjunction with the American Motel-Hotel Association.

Normally these courses run from 10-20 hours in length. Special courses such as cooking will run longer.

All of these courses are available in the area served by this Institute.

GENERAL ADULT EDUCATION

To meet the challenge of the space age, the curriculum of adult education will provide studies in subjects as current as the morning headlines and as old as organized knowledge. Any adult, 21 years of age or older, is eligible to enroll in this area. Today's program stresses training or retraining for jobs or upgrading in business or industry, homemaking and parent education, areas of instruction of special community interest, and a high school diploma program for those adults who wish to attain a high school equivalency diploma.

ADMISSION PROCEDURE AND REQUIREMENTS

GENERAL REQUIREMENTS

Any North Carolina citizen may be enrolled in a course if he meets the admission requirements. Such requirements will necessarily depend upon the course of study chosen. The applicant must be sixteen years of age or older and must possess certain basic aptitudes and interests. No applicant may enroll in more than one curriculum.

The applicant should be in reasonably good health with no impairment of vision or physical defect that would restrict his ability in a particular field of work. The applicant may, under certain conditions, be required to furnish evidence of satisfactory health.

The Institute is co-educational, and its program is not restricted to high school graduates. Technician level students must, however, possess the qualities and maturity of high school graduates. Technician level students must have completed two years of high school mathematics, including one year of algebra. Physics and chemistry are also desirable prerequisites for students entering the school of technology, although these courses are not required.

Educational background, experience, interest, and aptitudes will all be considered when an application is made to the Institute.

ADMISSION PROCEDURE

Persons wishing to enroll at the Institute must complete the entire application process. This consists of the following steps:

1. Submit an application form;
2. Obtain a transcript of credits from the last school attended;
3. Complete the battery of admission and placement tests administered by the Institute.
4. Have a personal interview with the Director of Student Personnel or other member of the administrative staff.

Upon receipt of the completed application form the Institute will schedule a date for test administration and notify the applicant by mail. Transcripts should be mailed from the school directly to the Institute on the transcript form in use by that school.

Upon completion of the above procedure, each applicant will receive written notification of the action taken by the admissions committee.

ADMISSION WITH ADVANCE STANDING

The Asheville-Buncombe Technical Institute will accept work and give credit for work completed in other Industrial Education Centers, Technical Institutes, or Colleges. Applicants for admission with advanced standing should make application as a regular applicant and submit a transcript of work from prior schools. No credit will be permitted for work below a "C" or the average grade given by another school. Acceptance of such work will be at the discretion of the President.

DEGREES, DIPLOMAS AND CERTIFICATES

DEGREE PROGRAMS DEFINED

The Asheville-Buncombe Technical Institute will confer an Associate in Applied Science degree in all Technical Curriculums. This degree is conferred in the name of the North Carolina State Board of Education when all requirements for graduation have been satisfied.

DIPLOMA PROGRAMS DEFINED

The Asheville-Buncombe Technical Institute will award a State Diploma in all Trade Curriculums. This diploma will be granted in the name of the North Carolina State Board of Education when all requirements for graduation have been satisfied.

CERTIFICATES

Certificates are issued in the name of the Asheville-Buncombe Technical Institute to students who successfully complete any short term program or course.

DEGREE AND DIPLOMA REQUIREMENTS FOR GRADUATION

The following list is established as minimum requirements for the Associate in Applied Science degree and State Diploma.

1. Complete all course requirements as outlined by curriculums, and earn at least a 2.0 grade point average in courses presented for graduation.
2. Application for graduation must be submitted to the Director of Student Personnel one quarter prior to completion of course requirements.
3. Prospective graduates must be recommended by the chairman of the department, in which a student completes his or her major work.
4. Fulfill all financial obligations to the Institute.
5. Be present for graduation exercises which are held during the last week of August each year. Exceptions to this requirement in cases of unavoidable absences, may be granted by the president of the institute.
6 Prospective graduates must be dressed for graduation in the proper academic attire.

Quality Points

At the end of each quarter quality points are assigned in accordance with the following formula. (The minimum grade-point ratio for graduation is 2.00 or an average grade of C.)

A—4 quality points per credit hour
B—3 quality points per credit hour
C—2 quality points per credit hour
D—1 quality point per credit hour

Grades of F, WP, WF, and I carry no quality points.

Quality ratings are determined by dividing the total number of quality points by the number of hours attempted. If a course is repeated, the last grade will be used in determining a student's hour-quality point ratio. A ratio of 2.00 indicates that the student has an average of C; above 2.00 indicates that he has an average above C; below 2.00 indicates that he has an average below C.

Grading System

Grades will be issued to all students who are failing at midterm and final grades will be issued at the end of the term to all students. Students will be graded on the acquirement of technical skills, ability to work under supervision, interest in work, initiative, and the ability to apply related information.

Students enrolled in either the school of Technology or the school of Trades will be graded by the following system.

A	93 - 100	Excellent
B	86 - 92	Above Average
C	78 - 85	Average
D	70 - 77	Passing
F	Below 70	Unsatisfactory
WP	Withdrawal passing	
WF	Withdrawal failing	
I	Incomplete	

Incomplete: Assigned when a student is unable to complete his work or take a final examination because of illness or for other reasons over which the student has no control. This grade is given only with the approval of the Director of Student Personnel. An "incomplete" must be removed within the first six weeks of the next term in which the student is enrolled. Otherwise, the grade becomes an "F."

FEES

Registration Fee (required of all students entering or re-entering)	$ 2.00
Tuition:	
Full time students (those enrolled for 12 credit hours or more), per quarter	$30.00
Part-time students (less than 12 credit hours), per credit hour, per quarter	$ 2.00
Student activity fee, per quarter	$ 1.75

In addition to fees above, students must purchase required textbooks for each course. Students will be advised in advance of the approximate total cost involved each quarter.

Student Insurance

Certain risks are inherent in any work involving regular contact with mechanical and electrical equipment. While stringent precautions will be taken to insure safety, it is felt to be in the interest of all students to provide some measure of insurance protection.

A group policy, providing the desired insurance protection, will be maintained in effect by the Institute and all students will be REQUIRED to subscribe to such coverage. The cost of accident insurance to the student will be approximately $2.50 per year.

Withdrawals & Academic Probation

Any student who must withdraw because of illness or personal hardship may, if his work is deemed satisfactory at the time of withdrawal, re-enter the course as a beginning student provided that such action is taken upon the immediate next offering of the course.

A student may be dismissed from school for failing to achieve passing marks in half the course work undertaken.

A failing grade for one report period will automatically result in academic probation for the following report period. Failure in two successive reporting periods may result in dismissal. Such cases will be considered individually.

Refunds

Refunds amounting to two-thirds of the initial tuition payment may be requested if a student has a valid withdrawal during the first twenty days of the quarter. No refunds will be made to students who withdraw without authority or who are dismissed for cause.

Attendance Requirements

The nature of the program at the Asheville Technical Institute requires students to be in attendance without interruption due to absences. The basic attendance policy is as follows:

1. A student's hours of absence in any class for whatever reason, may not exceed the number of credit hours for which he is enrolled. Example; Three credit hours=

maximum three absences. Students who exceed this number of absences may lose credit for the course. All cases are considered individually.

2. Students are required to give notice to their instructor, or to the Director of Student Personnel, in advance of an absence whenever possible. Excused absences are allowed in the following instances:

    A. Illness or injury to the student.
    B. Illness or death in the immediate family.
    C. Emergencies of other types. (Considered individually.)

3. Four consecutive absences will result in the student being dropped from the class and reinstatement must be accomplished through the Director of Student Personnel.

Student Conduct

Students will be expected to conduct themselves at all times as individuals of prudence and maturity. The rights and feelings of others will be respected. Each student shall demonstrate a high regard for school facilities and property and for the personal property of others.

School regulations which serve to control such activities as vehicle traffic and parking, smoking, loitering, and other aspects of personal conduct must be stringently observed.

Students may be promptly dismissed for conduct which is considered incompatible with standards of propriety and good judgment.

Additional Counseling and Testing

As mentioned under admission procedure, all applicants will be required to be subjected to a series of aptitude tests. This will be accomplished prior to acceptance and registration. The counselor will schedule interviews with students concerning interpretation of their test scores and he will advise students concerning course selections. Additional aptitude tests may be desirable to determine individual ability. Applicants are not encouraged to enroll unless it is believed that the student has made a sound choice and that he will profit from his choice.

Students are encouraged to use the counseling services at any time. The counseling service will work at all times with individuals to keep them informed of the progress they are making. Also, many reference materials are made available to students during the training program through the counseling service.

Placement Service

The Institute provides placement service which will assist students and alumni in securing employment. The objective of this service is to guide and assist the student and graduate in obtaining the type of position for which he is best qualified.

The Institute provides placement service by working closely with local industries and the employment agencies. Personal data sheets will be developed for those graduating students who desire this service. Data sheets will be mailed to selected businesses and industries and group and/or individual interviews arranged.

Library

A technical library is maintained by the Asheville-Buncombe Technical Institute for use by faculty and students. The library contains scientific and technological volumes as well as subject matter materials in all related fields and several current periodicals. New volumes are being added every quarter in order to keep abreast with technological advancements.

Student Lounge

A refreshment and lounge area equipped with a variety of modern vending machines is provided for the convenience of students and faculty. Foods and drinks may not be carried into a classroom, shop, or laboratory.

Loan Funds

The Institute has several loan plans available for students who need financial assistance. Amounts up to one-thousand dollars per year may be arranged by North Carolina residents who meet the qualifications of the various plans. Persons interested in obtaining funds should visit the institute for more specific information.

Kearfott Scholarship

The Kearfott Company of Swannanoa has established a scholarship fund which is available to students of Owen High School who attend the Institute. Recipients of this scholarship are selected by the Student Aid Committee in cooperation with officials from Owen High School. Applications may be submitted after February 1 of each year with selection made in April. The scholarships cover registration and tuition.

School of Engineering Technology

The following areas of study are included in the school of engineering technology.

Civil Engineering and Technology
Drafting and Design Technology
Electronics Technology
Chemical Engineering Technology
Mechanical Engineering Technology

All of the Curriculums in the school of engineering technology are seven quarters in duration and will require about twenty-five to thirty hours per week in classroom and laboratory work. If a student elects to enroll in the school of engineering technology through extension because of his work load, the time required for completion will double. The extension division will offer fifteen hours per week in a particular area of study.

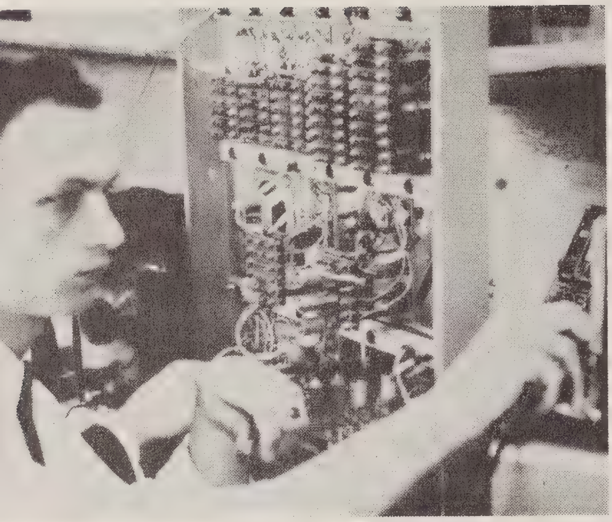
In addition to the regular classroom work each student will be required to spend additional time on outside assignments. The school of engineering technology will also require each student to demonstrate an ability to do research as it relates to original thinking.

Certain courses are required of every student irrespective of the curriculum area. These courses are core courses and will serve as related areas of study in addition to the subjects required by the technical speciality.

Important

The schools of engineering technology are divided into upper and lower level. In order for a student to advance into the upper level (2nd year), he or she must complete the lower (1st year) level work and be recommended by the chairman of the major department in which he is enrolled.

ELECTRONICS TECHNOLOGY



A.A.S. Degree Conferred

The electronic technology curriculum provides a broad theoretical and practical program of training for those who seek careers in the giant electronic industries. Special equipment is used by the instructor to present circuits of complicated electronics theory in step by step demonstration. In the laboratory the students develop skills in the use of modern electronic testing equipment and measuring instruments. Analysis of circuits, construction of electronic components, and theory of circuit design will be a major part of the laboratory work.

The related subjects will include applied physics, industrial economics, mathematics, technical reports, materials and processes, industrial organization, and technical drawing.

OCCUPATIONAL OPPORTUNITIES

Electronic Distributor Representative, Civil Service Electronics Inspector, Missile and Rocket Control Technician, Lab worker, Medical Electronics, and Radar Technician.

Course Title	*Class*	*Lab*	*Credit*
First Quarter			
T-ENG 101 Grammar	3	0	3
T-MAT 100 Mathematics	5	0	5
T-DFT 101 Technical Drafting	0	6	2
T-ELC 101 Fundamentals of Electricity	4	6	6
T-ECO 102 Economics	3	0	3
	15	12	19
Second Quarter			
T-ENG 102 Composition	3	0	3
T-MAT 101 Mathematics	5	0	5
T-PHY 101 Physics	3	2	4
T-DFT 102 Technical Drafting	0	6	2
T-ELC 102 Fundamentals of Electricity	4	6	6
	15	14	20
Third Quarter			
T-ENG 103 Report Writing	3	0	3
T-MAT 102 Technical Mathematics	5	0	5
T-PHY 102 Physics	3	2	4
T-ELN 101 Electronic Instruments and measurements	5	4	6
T-ELN 105 Control Devices	2	6	4
	18	12	22
Fourth Quarter			
T-MAT 103 Technical Mathematics	5	0	5
T-ENG 204 Oral Communication	3	0	3
T-PHY 104 Physics	3	2	4
T-ELN 205 Applications of Vacuum Tubes and Transistor	5	6	7
	16	8	19
Fifth Quarter			
T-SSC 201 Social Science	3	0	3
T-MAT 201 Technical Mathematics	5	0	5
T-ELN 210 Semiconductor Circuit Analysis	5	5	8
T-ELN 214 Wave Shaping and Pulse Circuits	6	6	6
	19	11	22

Course Title	Class	Lab	Credit
Sixth Quarter			
T-SSC 202 Social Science	3	0	3
T-ELN 215 Wave Shaping and Pulse Circuits	8	10	13
T-ELN 220 Electronic Systems (Network)	4	0	4
	15	10	20

Course Title	Class	Lab	Credit
Seventh Quarter			
T-ELN 221 Electronic Circuit Design	5	6	8
T-ELN 235 Industrial Instrumentation	8	8	10
T-PSY 206 Applied Psychology	3	0	3
	16	14	21

ELECTRONICS TECHNOLOGY

Course Descriptions

T-ELC 101 FUNDAMENTALS OF ELECTRICITY

Elementary principles of electricity including: basic electric units, Ohms law, Kirchhoffs law, network theorems, magnetics, basic electrical measuring instruments, inductance, capacitance, sine wave analysis, and non-resonant resistive, inductive and capacitive networks. Prerequisite: None.

T-ELC 102 FUNDAMENTALS OF ELECTRICITY

Series and parallel resonant-circuit analysis, resonant and non-resonant transformer analysis, basic diode power supply analysis, introduction to non-linear resistive control devices, and introduction to electro-mechanical devices. Prerequisite: T-ELC 101.

T-ELN 101 ELECTRONIC INSTRUMENTS AND MEASUREMENTS

A study of basic electronic instruments, their theory of operation, function, tolerances, and calibration. Both service and laboratory instruments will be studied. Laboratory experience will provide application of each type instrument studied. Prerequisite: T-ELC 102.

T-ELN 105 CONTROL DEVICES

A study in depth of the electrical characteristics of vacuum tubes and transistors. Basic parameters and applications of each type device to the three configurations of a three terminal two port system will be included. Prerequisite: T-ELC 102.

T-ELN 205 APPLICATIONS OF VACUUM TUBES AND TRANSISTORS

Practical applications of vacuum tubes and transistors to basic audio amplifiers, radio frequency amplifiers, detectors, modulators and oscillators. Prerequisite: T-ELN 105.

T-ELN 210 SEMICONDUCTOR CIRCUIT ANALYSIS

A study in some depth of the analysis and design of transistor circuits. Network theorems and equivalent circuits are used extensively in evaluating total circuit performance. Device peculiarities and limitations pertinent to reliable operations are considered. H. Y. Z. and T. parameters are employed as well as signal-flow graphs. Prerequisite: T-ELN 105.

T-ELN 214 WAVE SHAPING AND PULSE CIRCUITS

Broadband amplifiers, magnetic amplifiers, multivibrators, wave shaping techniques, chopper amplifiers, clipper and clamper circuits. Prerequisites: T-ELN 105, T-MAT 103.

T-ELN 215 WAVE SHAPING AND PULSE CIRCUITS

Pulse techniques, diode switches, gates, step-counters, restorers and other specific circuits which function as switches. Prerequisite: T-ELN 214.

T-ELN 220 ELECTRONIC SYSTEMS (NETWORK)

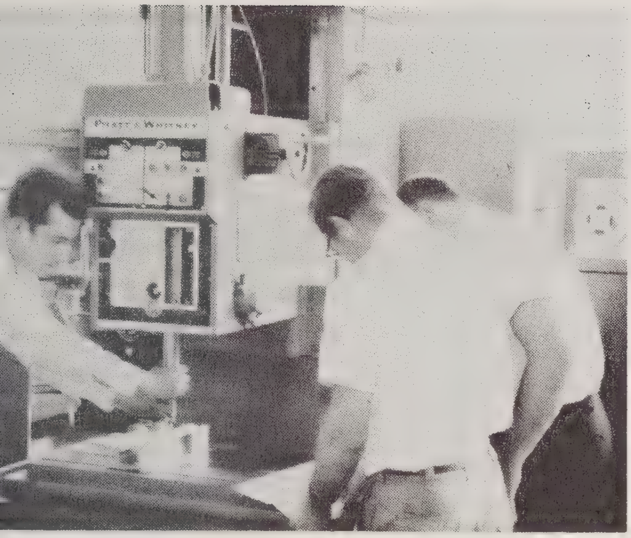
A block diagram course investigating numerous electronic systems. Modules or blocks of various circuits already studied are arranged in various manners to produce complex electronic systems. Systems will be explained and reduced to functions and then to block diagrams. AM, FM, and Single Sideband transmitters and receivers, multiplexing, TV transmitters and receivers, pulse-modulated systems, computers, telemetry, navigational systems, sonar and radar will be considered. Corequisite: T-ELN 215.

T-ELN 221 ELECTRONIC CIRCUIT DESIGN

An original design project including a complete research report. The development of a laboratory procedure that will substantiate an original hypothesis and a comparative analysis of the design data and the experimental results obtained. The evaluation of this course will be based on the report that must show originality, research capability, the application of theory to the practical aspect of the designed circuitry.

T-ELN 235 INDUSTRIAL INSTRUMENTATION

Broad introduction to use of industrial electro-mechanical and electronic circuits and equipment. Provides an understanding of the methods, techniques, and skills required for installation, service and operation of a variety of industrial control systems. Analysis of sensing devices for detecting changes in pressure, temperature, humidity, sound, light, electricity, the associated circuitry and indicating and recording devices Prerequisites: T-ELN 205, T-PHY 104.



A.A.S. Degree Conferred

MECHANICAL ENGINEERING TECHNOLOGY

The mechanical technology student will learn the principles of machine design and their applications. He studies torsion, bending, and flexture, of metals; industrial machinery, clutches, brakes, springs, and flywheels. He designs linkage, gear trains, and cams to give required motion to machine. The student will make accurate and complete engineering drawings of the parts that have been designed so that these parts can be produced in the shop. A complete study of materials and processes will be conducted by each student.

OCCUPATIONAL OPPORTUNITIES

Sales Engineers, Research Assistants, Layout and Detail Draftsman, Foreman, Machine Designers, Assistant Plant Engineers, Field Service Engineers, Plant Safety Technician, and Mechanical Test Technician.

First Quarter

Course Title	*Class*	*Lab*	*Credit*
T-ENG 101 Grammar	3	0	3
T-MAT 100 Mathematics	5	0	5
T-DFT 101 Technical Drafting	0	6	2
T-MEC 101 Machine Processes	0	6	2
T-ECO 102 Economics	3	0	3
	11	12	15

Second Quarter

Course Title	*Class*	*Lab*	*Credit*
T-ENG 102 Composition	3	0	3
T-MAT 101 Technical Mathematics	5	0	5
T-PHY 101 Physics	3	2	4
T-DFT 102 Technical Drafting	0	6	2
T-MEC 102 Machine Processes	0	6	2
	11	14	16

Third Quarter

Course Title	*Class*	*Lab*	*Credit*
T-ENG 103 Report Writing	3	0	3
T-MAT 102 Technical Mathematics	5	0	5
T-PHY 102 Physics	3	2	4
T-PHY 106 Applied Mechanics	5	0	5
T-MEC 103 Machine Processes	0	6	2
	16	8	19

Fourth Quarter

Course Title	*Class*	*Lab*	*Credit*
T-ENG 204 Oral Communications	3	0	3
T-MEC 205 Strength of Materials	3	2	4
T-MEC 201 Machine Processes	2	6	4
T-MAT 103 Technical Mathematics	5	0	5
T-PHY 103 Physics	3	2	4
	16	10	20

Fifth Quarter

Course Title	*Class*	*Lab*	*Credit*
T-MEC 210 Physical Metallurgy	3	3	4
T-MEC 213 Production Planning	3	3	4
T-SSC 201 Social Science	3	0	3
T-DFT 211 Mechanisms	3	2	4
	12	8	15

Sixth Quarter

Course Title	Class	Lab	Credit
T-MEC 211 Physical Metallurgy	3	3	4
T-ISC 202 Quality Control	3	2	4
T-SSC 202 Social Science	3	0	3
T-MEC 235 Hydraulics and Pneumatics	3	3	4
	12	8	15

Seventh Quarter

Course Title	Class	Lab	Credit
T-ISC 203 Motion Study	3	2	4
T-PSY 206 Applied Psychology	3	0	3
T-BUS 110 Office Machines (Calculators)	2	2	3
T-DFT 212 Jig and Fixture Design	2	6	4
T-MEC 214 Tool Engineering	3	0	3
	13	10	17

MECHANICAL ENGINEERING TECHNOLOGY

Course Descriptions

T-MEC 101 MACHINE PROCESSES

An introductory course designed to acquaint the student with basic hand tools, safety procedures and machine processes of our modern industry. It will include a study of measuring instruments, characteristics of metals and cutting tools. The student will become familiar with the lathe family of machine tools by performing selected operations such as turning, facing, threading, drilling, boring, and reaming. Prerequisite: None.

T-MEC 102 MACHINE PROCESSES

Advanced operations on lathe, drilling, boring and reaming machines. Milling machine theory and practice. Thorough study of the types of milling machines, cutters, jig and fixture devices, and the accessories used in a modern industrial plant. Safety in the operational shop is stressed. Prerequisite: T-MEC 101.

T-MEC 103 MACHINE PROCESSES

Modern machine tools of industry. Theory and practice with shaper, slotter, planer, turret lathe, screw machine, grinding and finishing machines. Gear design and the processes of gear manufacturing. Prerequisite: T-MEC 102.

T-MEC 201 MACHINE PROCESSES

Newer concepts of work handling and automatic machining process. Chipless production and new techniques in metal forming. Analysis of high-energy forming, ultrasonic machining, electrolytic metal removal, chemical milling, numerical controls and simplified building block numerical control systems. Prerequisite: T-MEC 103.

T-MEC 210 PHYSICAL METALLURGY

Introductory course in metallurgy, a basic study of the properties of metals and alloys. Analysis of the structure of metals and alloys, atomic structure, nuclear structure, and nuclear reactions. Solid (crystalline) structures, methods of designating crystal planes, liquid and vapor phases, phase diagrams, and alloy systems. Prerequisite: T-PHY 101.

T-MEC 213 PRODUCTION PLANNING

Day-to-day plant direction; forecasting, product planning and control, scheduling, dispatching, routing, and inventory control. Case histories are discussed in the classroom, and courses of corrective action are developed. Drafting room layouts for planning and control. Prerequisite: T-DFT 102. Corequisite: T-MEC 201.

T-MEC 211 PHYSICAL METALLURGY

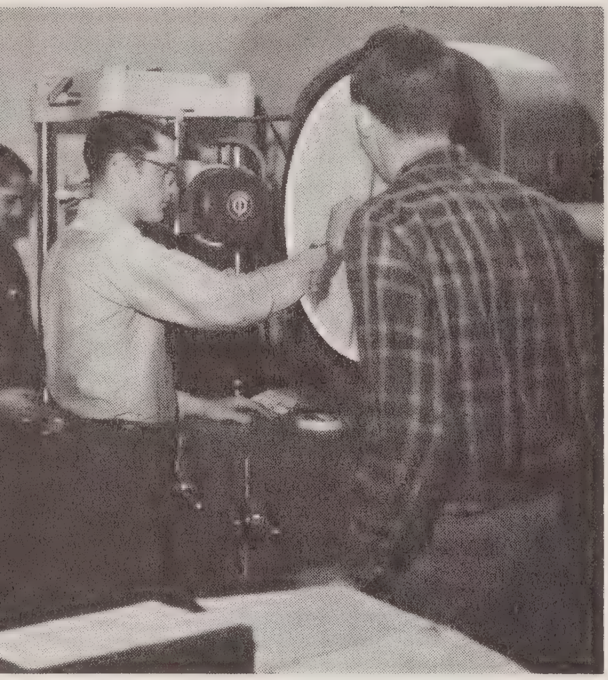
Properties of metals and alloys, the reactions of metals, diffusion, carburizing, metal bonding and homogenization, recrystallization and grain growth, age hardening, nitriding, internal oxidation, heat treatment of steel, laboratory experiments and demonstrations. Prerequisite: T-MEC 210.

T-ISC 202 QUALITY CONTROL

Principles and techniques of quality control and cost saving. Organization and procedure for efficient quality control. Functions, responsibilities, structures, costs, reports, records, personnel and vendor-customer relationships in quality control. Sampling inspections, process control and tests for significance. Prerequisite: None.

T-ISC 203 MOTION STUDY

Types of methods studies and their applications. Process charts, analysis sheets, time study, work simplification, skill and effort rating. Prerequisite: None.



A.A.S. Degree Conferred

CIVIL ENGINEERING TECHNOLOGY

Construction technicians perform many of the planning and supervisory tasks necessary in the construction of highways, bridges, power plants, dams, missile sites, airfields, water and sewage treatment plants, industrial buildings and utilities. In the planning stages of construction they may be engaged in estimating costs, ordering materials, interpreting specifications, computing earthwork and fills and storm drainage requirements, surveying or drafting. Once the actual construction work has begun, many technicians perform supervisory functions. Some may be responsible for seeing that construction activities are performed in proper sequence, and for inspecting the work as it progresses for conformance with blueprints and specifications.

OCCUPATIONAL OPPORTUNITIES

An individual upon graduating from this program should qualify for various jobs such as, Instrument Man, Party Chief, Quantity Survey Man, Material Tester (Laboratory Testing), Expediter, Field Clerk, Materials Man, Construction Equipment and Materials Salesman, and Field Draftsman.

First Quarter

Course Title	*Class*	*Lab*	*Credit*
T-ENG 101 Grammar	3	0	3
T-MAT 100 Mathematics	5	0	5
T-DFT 101 Technical Drafting	0	6	2
T-CIV 101 Surveying	2	6	4
T-ECN 102 Economics	3	0	3
	13	12	17

Second Quarter

Course Title	*Class*	*Lab*	*Credit*
T-ENG 102 Composition	3	0	3
T-MAT 101 Technical Mathematics	5	0	5
T-PHY 101 Physics	3	2	4
T-DFT 102 Technical Drafting	0	6	2
T-CIV 114 Statics	5	0	5
	16	8	19

Third Quarter

Course Title	*Class*	*Lab*	*Credit*
T-ENG 103 Report Writing	3	0	3
T-MAT 102 Technical Mathematics	5	0	5
T-PHY 102 Physics	3	2	4
T-CIV 102 Surveying	2	6	4
T-CIV 216 Strength of Materials	3	2	4
	16	10	20

Fourth Quarter

Course Title	*Class*	*Lab*	*Credit*
T-MAT 103 Technical Mathematics	5	0	5
T-PHY 103 Physics	3	2	4
T-ENG 104 Oral Communication	3	0	3
T-CIV 201 Properties of Engineering Materials	2	3	3
T-CIV 103 Surveying	2	6	4
	15	11	19

Course Title	Class	Lab	Credit
Fifth Quarter			
T-CIV 218 Plain Concrete	3	3	4
T-CIV 217 Construction Methods and Equipment	3	2	4
T-SSC 201 Social Science	3	0	3
T-CIV 220 Construction Planning	2	3	3
T-CIV 223 Codes, Contracts and Specifications	2	0	2
	13	8	16
Sixth Quarter			
T-SSC 202 Social Science	3	0	3
T-CIV 202 Properties of Soils	2	3	3
T-CIV 225 Construction Estimates and Costs	3	6	5
T-CIV 219 Steel and Timber Construction	3	2	4
	11	11	15
Seventh Quarter			
T-CIV 227 Construction of Roads and Pavements	3	2	4
T-CIV 204 Surveying	2	6	4
T-CIV 221 Reinforced Concrete Construction	3	2	4
T-PSY 206 Applied Psychology	3	0	3
	11	10	15

Civil Engineering Technology

COURSE DESCRIPTIONS

T-CIV 101 SURVEYING

Theory and practice of plane surveying, including taping, differential and profile leveling, cross sections, earthwork computations, transit, stadia and transit-tape surveys. Corequisites: T-MAT 101, T-DFT 101.

T-CIV 114 STATICS

Forces, resultants, and types of force systems; moments, equilibrium of coplanar forces by analytical and graphic methods; stresses and reactions in simple structures; equilibrium of forces in space; static and kinetic friction; center of gravity, centroids, and moment of inertia. Corequisite: T-MAT 102.

T-CIV 102 SURVEYING

Triangulation of ordinary precision; use of plane table; calculation of areas of land; land surveying; topographic surveys and mapping. Prerequisite: T-CIV 101. Corequisites: T-MAT 102, T-DFT 102.

T-CIV 216 STRENGTH OF MATERIALS

Fundamental stress and strain relationship; torsion; shear and bending moments; stresses and deflections in beams; introduction to statically indeterminate beams; columns; combined stresses. Prerequisite: T-CIV 114. Corequisite: T-MAT 103.

T-CIV 201 PROPERTIES OF ENGINEERING MATERIALS

Study and testing of the properties of ferrous and nonferrous metals, timber, stone, clay products, bituminous cementing materials; load and strain measurements; behavior of materials under load; qualities other than strength; control of the properties of the materials; non-destructive tests. Prerequisite: T-PHY 101. Corequisite: T-CIV 216.

T-CIV 103 SURVEYING

Route surveys by ground and aerial methods; simple, compound, reverse, parabolic and spiral curves; geometric design of highways; highway surveys and plans, including mass diagrams. Prerequisite: T-CIV 102. Corequisite: T-MAT 103.

T-CIV 218 PLAIN CONCRETE

Study and testing of the composition and properties of concrete including cementing agents, aggregates, admixtures, and air-entrainment; design and proportioning of concrete mixes to obtain pre-determined strengths and properties; methods of placing and curing concrete; standard control tests of concrete. Corequisite: T-CIV 201.

T-CIV 217 CONSTRUCTION METHODS AND EQUIPMENT

Excavating methods and equipment used in building and highway construction; pile driving; construction techniques and equipment used in reinforced concrete buildings, bridges, lift-slaps, thin-shells and folded plates, erection methods and equipment of structural steel buildings and bridges; carpentry in house and heavy timber construction; construction safety. Field inspection trips. Prerequesites: T-DFT 102, T-CIV 102.

T-CIV 220 CONSTRUCTION PLANNING

Analysis of construction plant layout requirements and contractor's organization for building and highway projects. Construction scheduling; project control and supervision; coordinating trades on building construction. Operations, charts, and practical application of Critical Path Method (CPM) for construction planning, scheduling, and "time-cost" determination. Prerequisites: T-CIV 217, T-CIV 218, T-CIV 219. Corequisite: T-CIV 223.

T-CIV 223 CODES, CONTRACTS AND SPECIFICATIONS

Basic principles and methods most significant in contract relationships; appreciation of the legal considerations in construction work; study of the National Building Code and local building codes, interpreting and outlining specification. Prerequisite: None.

T-CIV 202 PROPERTIES OF SOILS

Study of soil types and their physical properties; mechanical analysis and tests of soils; techniques of subsurface investigation; earth pressure theories; bearing capacity; stability of slopes; hydrostatics of ground water; methods of compaction and consolidation. Prerequisite: T-CIV 216.

T-CIV 225 CONSTRUCTION ESTIMATES AND COSTS

Interpretation of working drawings of timber, structural steel, and reinforced concrete structures and highways; preparation of material and labor quantity surveys from plans and specifications; approximate and detailed estimates of costs, bidding procedures and preparation of bids. Prerequisite: T-CIV 220. Corequisite: T-CIV 227.

T-CIV 219 STEEL AND TIMBER CONSTRUCTION

Analysis and basic design of steel beams, tension members, columns, and riveted, high strength bolted, welded connections; study of plate girders, industrial building roofs and vents, continuous spans, lightweight steel construction; use of American Institute of Steel Construction Manual; introduction to rigid frames and plastic design in steel. Design of timber members and their connections. Field inspection trips. Prerequisite: T-CIV 216.

T-CIV 227 CONSTRUCTION OF ROADS AND PAVEMENTS

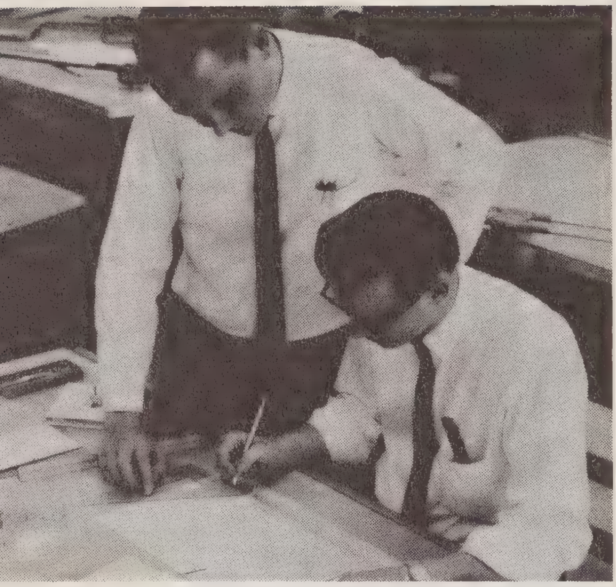
Construction practices for various types of road building, including soil properties, grading, subgrading, base courses, drainage, embankments, compaction, and formwork. Design, construction, and testing of rigid Portland-cement concrete and flexible bituminous pavements. Field inspection trips. Prerequisites: T-CIV 217, T-CIV 218, T-CIV 202.

T-CIV 204 SURVEYING

Aerial photogrammetry; applications of aerial surveys; building and road construction surveying; lines and grades for foundation layout, building construction, bridge layout, sewer and pipe line surveys. Prerequisite: T-CIV 103.

T-CIV 221 REINFORCED CONCRETE CONSTRUCTION

Analysis and design of reinforced concrete beams, floor systems, and columns. Use of CRSI Design Handbook. Introduction to ultimate strength design. Principles of prestressed and precast concrete. Field inspection trips. Prerequisite: T-CIV 216.



A.A.S. Degree Conferred

DRAFTING AND DESIGN TECHNOLOGY

The Curriculum for Drafting and Design has been designed to provide optimum specialized technician instruction in a two year program.

The courses are arranged in a sequence that gives the student the required technological and specialized courses as they are needed to coordinate his laboratory experiences.

The curriculum is designed to qualify the graduate for performance of duties in the field of mechanical drafting and design requiring the application of engineering principles, but as applied to the technical rather than the engineering field. As the student develops in drafting skills, mathematics, and related science, a gradual shift is made in the curriculum applying these skills to practical problems in design.

OCCUPATIONAL OPPORTUNITIES

Typical job opportunities are found in the areas of state government, civil service, construction companies, industries, engineering consulting firms, and architectural firms.

Course Title	*Class*	*Lab*	*Credit*
First Quarter			
T-ENG 101 Grammar	3	0	3
T-MAT 100 Mathematics	5	0	5
T-DFT 101 Technical Drafting	0	6	2
T-MEC 101 Machine Processes	0	6	2
T-ECO 102 Economics	3	0	3
	11	12	15
Second Quarter			
T-ENG 102 Composition	3	0	3
T-MAT 101 Technical Mathematics	5	0	5
T-PHY 101 Physics	3	2	4
T-DFT 102 Technical Drafting	0	6	2
T-MEC 102 Machine Processes	0	6	2
	11	14	16

Course Title	*Class*	*Lab*	*Credit*
Third Quarter			
T-ENG 103 Report Writing	3	0	3
T-MAT 102 Technical Mathematics	5	0	5
T-PHY 102 Physics	3	2	4
T-DFT 103 Technical Drafting	0	6	2
T-PHY 106 Applied Mechanics	5	0	5
	16	8	19
Fourth Quarter			
T-ENG 204 Oral Communication	3	0	3
T-MAT 103 Technical Mathematics	5	0	5
T-PHY 103 Physics	3	2	4
T-DFT 201 Technical Drafting	2	6	4
T-MEC 205 Strength of Materials	3	2	4
	16	10	20

Fifth Quarter

Course Title	*Class*	*Lab*	*Credit*
T-DFT 204 Descriptive Geometry	2	4	4
T-MEC 210 Physical Metallurgy	3	3	4
T-SSC 201 Social Science	3	0	3
T-DFT 205 Design Drafting I	2	6	4
T-DFT 211 Mechanisms	3	2	4
	13	15	19

Sixth Quarter

Course Title	*Class*	*Lab*	*Credit*
T-MEC 211 Physical Metallurgy	3	3	4
T-SSC 202 Social Science II	3	0	3
T-MEC 235 Hydraulics and Pneumatics	3	3	4
T-DFT 206 Design Drafting II	2	6	4
	11	12	15

Seventh Quarter

Course Title	*Class*	*Lab*	*Credit*
T-PSY 206 Applied Psychology	3	0	3
T-DFT 212 Jig and Fixture Design	2	6	4
T-MEC 214 Tool Engineering	3	0	3
T-BUS 110 Office Machines (Calculators)	2	2	3
T-ELC 201 Electrical Machinery	3	0	3
	13	8	16

DRAFTING AND DESIGN TECHNOLOGY

Course Descriptions

T-DFT 101 TECHNICAL DRAFTING

The field of drafting is introduced as the student begins study of drawing principles and practices for print reading and describing objects in the graphic language. Basic skills and techniques of drafting included are: use of drafting equipment, lettering, freehand orthographic and pictorial sketching, geometric construction, orthographic instrument drawing of principal views, and standards and practices of dimensioning. The principles of isometric, oblique, and perspective are introduced. Prerequisite: None.

T-MEC 101 MACHINE PROCESSES

An introductory course designed to acquaint the student with basic hand tools, safety procedures and machine processes of our modern industry. It will include a study of measuring instruments, characteristics of metals and cutting tools. The student will become familiar with the lathe family of machine tools by performing selected operations such as turning, facing, threading, drilling, boring, and reaming. Prerequisite: None.

T-DFT 102 TECHNICAL DRAFTING

The application of orthographic projection principles to the more complex drafting problems, primary and secondary auxiliary views, simple and successive revolutions, and sections and conventions will be studied. Most important is the introduction of the graphical analysis of space problems. Problems of practical design elements involving points, lines, planes, and a combination of these elements shall be studied. Dimensioning practices for "details" and "working drawings," approved by the American Standards Association will also be included. Introduction is given to intersections and developments of various types of geometrical objects. Prerequisite: T-DFT 101.

T-MEC 102 MACHINE PROCESSES

Advanced operations on lathe, drilling, boring and reaming machines. Milling machine theory and practice. Thorough study of the types of milling machines, cutters, jig and fixture devices, and the accessories used in a modern industrial plant. Safety in the operational shop is stressed. Prerequisite: T-MEC 101.

T-DFT 103 TECHNICAL DRAFTING

Intersection and developments and their practical solutions. Where applicable, model solutions accompany the problems. The various techniques employed to produce and render isometric and oblique drawings, isometric, dimetric and trimetric projections, will be included. Prerequisite: T-DFT-102.

T-DFT 201 TECHNICAL DRAFTING

Applications and constructions of charts, graphs, and nomographs in engineering and technical data. Screw threads, springs, keys, rivets, piping, and welding symbols, methods of representing and specifying will be covered. Basic mechanisms of motion transfer, gears and cams, will be studied and drawn with emphasis on methods of specifying, calculating, dimensions, and delineating. Prerequisite: T-DFT 103.

T-DFT 204 DESCRIPTIVE GEOMETRY

Graphic analysis of space problems involving, points, lines, planes, connectors, and a combination of these. Practical design problems will be stressed with analytical verification where applicable visualization shall be stressed on every problem. Prerequisites: T-DFT 102, T-MAT 102.

T-DFT 205 DESIGN DRAFTING I

Basic design is introduced in the study of motion transfer mechanisms as they relate to power trains. Principles of design sketching, design drawing, layout drafting, detailing from layouts, production drawings and simplified drafting practices constitute areas of study. Types and methods of specifying materials and workmanship are an integral part of the course. Prerequisites: T-DFT 204, T-MAT 102, T-PHY 102.

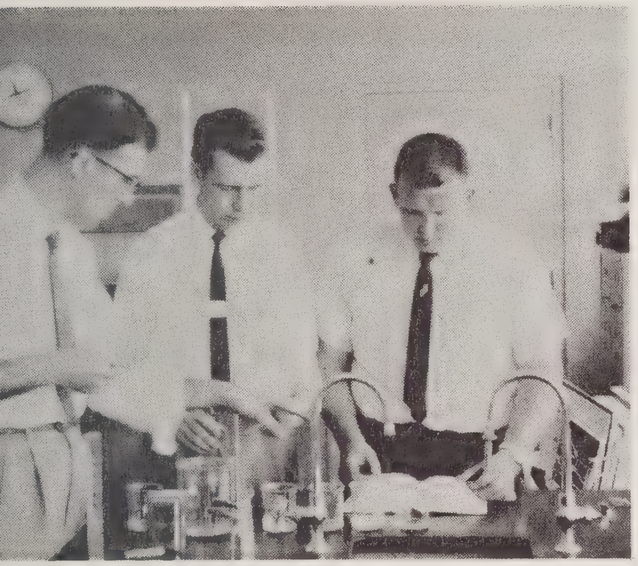
T-DFT 206 DESIGN DRAFTING II

Research to solve a problem in design by consulting various manuals, periodicals, and through laboratory experiments. A written technical report, preliminary design sketches, layout drawings, detail drawings, assembly and sub-assembly drawings, pictorial drawings, exploded pictorial assembly, patent drawings and specifications are required as a part of the problem. Prerequisites: T-DFT 205, T-DFT 210.

T-ELC 201 ELECTRICAL MACHINERY

A course in the basic understanding and application of electricity to modern industrial machinery. Included is a study of direct current motors, motor controls and protecting devices, transformers, and the industrial applications of this equipment. Prerequisite: T-PHY 103.

CHEMICAL ENGINEERING TECHNOLOGY (Industrial)



A.A.S. Degree Conferred

The chemical technology student studies the fundamentals of general chemistry and organic chemistry and learns how to perform qualitative, and analytical analyses. The student will study substance and the reactions between them and learns the methods and procedures used in the discovery and development of new products. In the unit operation laboratory the student will learn material handling; crushing, grinding, and sizing; he studies chemical machinery and methods used in extraction, distillation, evaporation, drying, absorption, and heat transfer. He also devises, installs, and operates chemical manufacturing processes.

OCCUPATIONAL OPPORTUNITIES

The chemical technology graduate will find employment in a wide variety of fields such as foods, metals, paints, glass, plastics, rubber, fuels, paper, building products, dyes, oils, lubricants, and heavy chemicals.

This individual will fill such jobs as Research Assistant, Control Chemist, Laboratory Technician, Chemical Analyst, and Pilot Plant Foreman.

First Quarter

Course Title	*Class*	*Lab*	*Credit*
T-ENG 101 Grammar	3	0	3
T-MAT 100 Mathematics	5	0	5
T-DFT 101 Technical Drafting	0	6	2
T-CHM 111 General Chemistry	4	3	5
T-ECO 102 Economics	3	0	3
	15	9	18

Second Quarter

Course Title	*Class*	*Lab*	*Credit*
T-ENG 102 Composition	3	0	3
T-MAT 101 Technical Mathematics	5	0	5
T-PHY 101 Physics	3	2	4
T-DFT 102 Technical Drafting	0	6	2
T-CHM 112 General Chemistry	4	3	5
	15	11	19

Third Quarter

Course Title	*Class*	*Lab*	*Credit*
T-ENG 103 Report Writing	3	0	3
T-MAT 102 Technical Mathematics	5	0	5
T-PHY 102 Physics	3	2	4
T-CHM 121 Quantitative Chemical Analysis	3	6	5
	14	8	17

Fourth Quarter

Course Title	*Class*	*Lab*	*Credit*
T-ENG 204 Oral Communications	3	0	3
T-MAT 103 Technical Mathematics	5	0	5
T-PHY 103 Physics	3	2	4
T-CHM 222 Quantitative Chemical Analysis	2	9	5
T-CHM 227 Physical Chemistry	3	2	4
	16	13	21

Course Title	Class	Lab	Credit
Fifth Quarter			
T-SSC 201 Social Science	3	0	3
T-CHM 231 Organic Chemistry	3	6	5
T-CHM 241 Industrial Chemical Analysis	3	9	6
T-MEC 116 Engineering Materials	3	0	3
	12	15	17
Sixth Quarter			
T-SSC 202 Social Science	3	0	3
T-MEC 235 Hydraulics and Pneumatics	3	3	4
T-CHM 232 Organic Chemistry	3	6	5
T-CHM 242 Industrial Chemical Analysis	3	9	6
	12	18	18
Seventh Quarter			
T-PSY 206 Applied Psychology	3	0	3
T-BUS 110 Office Machines (Calculators)	2	2	3
T-CHM 243 Industrial Chemistry Review	3	9	6
T-PHY 104 Physics	3	2	4
	11	13	16

CHEMICAL ENGINEERING TECHNOLOGY (Industrial)

Course Descriptions

T-CHM III GENERAL CHEMISTRY

An introductory chemistry course involving chemical terminology, atomic structure, properties of some elements, and the function of the periodic table. Properties of compounds and mixtures are studied as are types of chemical reactions. Laboratory work consists of various inorganic reactions and preparations. Prerequisite: None.

T-CHM 112 GENERAL CHEMISTRY

A study of the properties of elements not covered T-CHM 101 and a study in greater depth of the combining properties of the elements including equivalent weights. Laboratory work includes chemical reactions and an investigation of properties of solutions. Prerequisite: T-CHM III.

T-CHM 121 QUANTITATIVE CHEMICAL ANALYSIS

Emphasis is placed on developing laboratory techniques employed in the volumetric analysis of acids and bases. The students will become thoroughly familiar with the principles and procedures of neutralization titration. Classroom work will emphasize the stoichiometric calculations involved in interpreting the results of analysis. Laboratory work will consist of percentage analysis of selected substances. Prerequisite: T-CHM 112.

T-CHM 222 QUANTITATIVE CHEMICAL ANALYSIS

The more complex types of quantitative analysis. Special emphasis on the theory of oxidation-reduction and gravimetric analysis. Instrumental analysis is introduced and use of modern analytical devices is stressed. The student will become familiar with the principles of redox reactions, ionization constants and pH of solutions. Stress is placed on the stoichiometric calculations of quantitative chemical analysis. Classroom work complements quantitative determinations in the laboratory. Prerequisite: T-CHM 121.

T-CHM 227 PHYSICAL CHEMISTRY

Atomic theory, states of matter, chemical thermodynamics, molecular properties of solutions, equilibria, phase role, electrochemistry, kinetics, surface chemistry, and photochemistry constitute major areas of study. Prerequisite: T-CHM 121.

T-CHM 231 ORGANIC CHEMISTRY

Nomenclature, structure, preparation, properties, and reactions of aliphatic organic compounds. Laboratory work emphasizes techniques. Prerequisite: T-CHM 222.

T-CHM 241 INDUSTRIAL CHEMICAL ANALYSIS

An industrial laboratory situation is simulated. Principles and techniques learned in previous quarters are utilized in solution of problems common to local industry. It will be the responsibility of the instructor to determine and submit in outline form a program of suitable scope and sequence of topics which he will work out from consultation with his local advisory committee, representing the industry. This program must be approved by the administration and accepted by the appropriate State-level authority. Prerequisites: T-CHM 222, T-CHM 227.

T-CHM 232 ORGANIC CHEMISTRY

The nomenclature, structure, preparation, properties, and reactions of aromatic organic compounds. Laboratory work emphasizes techniques and involves preparation and analysis of selected organic compounds. Prerequisites: T-CHM 231, T-CHM 227.

T-CHM 242 INDUSTRIAL CHEMICAL ANALYSIS

An industrial laboratory situation is maintained and the emphasis on instrumentation is expanded. Problems of industrial quality control. Plant visitations. Prerequisites: T-CHM 241.

School of Business Education

The following areas of study are included in the school of Business Education.

Data Processing Technology (Business)

Executive Secretarial

Business Administration

All of the areas of study in the School of Business Education are seven quarters in duration and will require from twenty to thirty hours per week of course work. If a student elects to enroll in the school of Business Education through extension because of his work load, the time required for completion will be doubled. The extension or evening school division will offer fifteen hours per week in a particular area of study.

In addition to regular classroom work each student will be required to spend additional time on outside work assignments.

The school of Business Education will require each student to become fully aware of the latest methods employed in the business world.

Important

The schools of business education are divided into upper and lower levels. In order for a student to advance into the upper level (2nd year) he or she must complete the lower (1st year) level work and be recommended by the chairman of the major department in which he is enrolled.

A.A.S. Degree Conferred

DATA PROCESSING—BUSINESS

The data processing courses are arranged in a workable sequence suitable to the instructional needs of the students with an appropriate balance between technical courses, general education courses, and laboratory exercises. The arrangement of the curriculum is such that it proceeds from elementary work to work that is more complex. Within the subject material of each course the concepts are solidified through practical application. The outline below is the business approach; however, it is possible for the student to elect certain subjects and study in the scientific area of data processing.

OCCUPATIONAL OPPORTUNITIES

Typical occupational opportunities are found in banking, civil service, industry, business, and insurance companies. Research activities also utilize trained persons in this field.

Course Title	*Class*	*Lab*	*Credit*
First Quarter			
T-ENG 101 Grammar	3	0	3
T-MAT 100 Mathematics	5	0	5
T-EDP 101 Functional Wiring Principles	2	3	3
T-EDP 104 Introduction to Data Processing Systems	3	2	4
T-ECO 102 Economics	3	0	3
	16	5	18
Second Quarter			
T-ENG 102 Composition	3	0	3
T-BUS 120 Accounting	5	2	6
T-MAT 101 Technical Mathematics	5	0	5
T-EDP 106 Business Programming	2	4	4
T-EDP 102 Functional Wiring Principles	2	3	3
	17	9	21
Third Quarter			
T-ENG 103 Report Writing	3	0	3
T-MAT 121 Numbering Systems and Boolean Algebra	4	0	4
T-BUS 121 Accounting	5	2	6
T-EDP 108 Scientific Programming	2	4	4
	14	6	17
Fourth Quarter			
T-MAT 102 Technical Mathematics	5	0	5
T-ENG 204 Oral Communication	3	0	3
T-BUS 122 Accounting	5	2	6
T-EDP 202 Programming System Techniques	3	4	5
	16	6	19
Fifth Quarter			
T-SSC 201 Social Science	3	0	3
T-MAT 103 Technical Mathematics	5	0	5
T-EDP 205 Linear Programming and Critical Path Method	2	4	4
T-BUS 225 Cost Accounting	3	2	4
	13	6	16

Sixth Quarter

Course Title	Class	Lab	Credit
T-SSC 202 Social Science	3	0	3
T-MAT 214 Statistics	5	0	5
T-BUS 235 Business Management	3	0	3
T-EDP 219 Systems and Procedures	3	4	5
T-BUS 115 Business Law	5	0	5
	19	4	21

Seventh Quarter

Course Title	Class	Lab	Credit
T-EDP 216 Research Project	1	8	5
T-EDP 208 Advance Programming Techniques	2	6	5
T-BUS 110 Office Machines (Caluculations)	2	2	3
T-PSY 206 Applied Psychology	3	0	3
	8	16	16

DATA PROCESSING — BUSINESS

Course Description

T-EDP 101 FUNCTIONAL WIRING PRINCIPLES

The fundamental principles of wiring necessary to perform basic machine functions of printing, punching, comparing and selection. A series of laboratory experiments supports the theoretical aspects of this course. Prerequisite: None.

T-EDP 104 INTRODUCTION TO DATA PROCESSING SYSTEMS

Fundamental concepts and operational principles of data processing systems, as an aid in developing a basic knowledge of computers, prerequisite to the detail study of particular computer problems. This course is a prerequisite for all programming courses. Prerequisite: None.

T-EDP 106 BUSINESS PROGRAMMING

The effective use of data processing equipment in meeting the information needs of business; utilizing the symbolic prgramming system as a tool in the solution of problems. The scope of the problems developed will vary from a modest payroll procedure to the total information retrieval for a large and complex business. Prerequisites: T-EDP 101, T-MAT 101, T-EDP 104.

T-EDP 102 FUNCTIONAL WIRING PRINCIPLES

Additional study of the fundamental principles of wiring necessary to perform basic machine functions of printing, punching, comparing and selection with emphasis on the accounting machine. A series of laboratory experiments support the theoretical aspects of this course. Prerequisite: T-EDP 101.

T-MAT 121 NUMBERING SYSTEM AND BOOLEAN ALGEBRA

A cursory treatment of the base-ten numbering system; functional introduction to numbering systems with bases other than 10, transformation from one system to another; fundamental operation in systems other than the decimal; a detailed study of the binary system in relation to machine calculations; principles of Boolean Algebra and its contribution to digital devices and data processing. Prerequisite: None.

T-EDP 202 PROGRAMMING SYSTEM TECHNIQUES

The student will investigate the functions and capabilities of different data processing machines and will become familiar with some of the procedures necessary for programming objectives. Programming drills, exercises, and case studies will add the realism of processing data to theoretical knowledge. Prerequisites: T-EDP 102, T-EDP 104, T-EDP 108.

T-EDP 205 LINEAR PROGRAMMING AND CRITICAL PATH METHOD

Lecture and case problems encompassing the scope and potential of using mathematical programming with computers to increase industrial efficiency. This course presents the network technique of management planning, scheduling and control. Basic rules of network planning are presented with laboratory assignments designed to implement the theoretical aspects of Critical Path Methods (CPM). Prerequisites: T-EDP 108, T-MAT 103, T-EDP 202.

T-EDP 219 SYSTEMS AND PROCEDURES

A study of the problems of system design and installation. Systems used in various type businesses are studied and discussed. Actual practice is given in evaluation of existing business systems directed toward the feasibility of computer applications. Prerequisites: T-EDP 108, T-BUS 121.

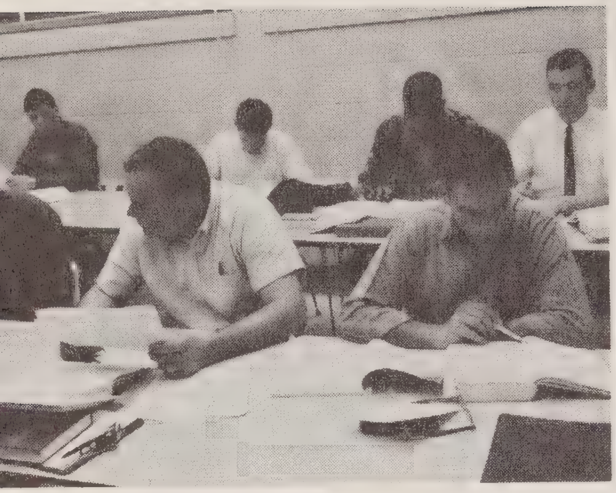
T-EDP 216 RESEARCH PROJECT

Individual assignments of a carefully selected project will be the work of the student during this quarter. It will give the student an opportunity to initiate and carry out a project taken from outside the school. This course places the responsibility upon the student to solve a significant problem with a minimum of assistance from the instructor. Prerequisite: T-EDP 205.

T-EDP 208 ADVANCE PROGRAMMING TECHNIQUES

Detail analysis and study of computer softwear, mathematical modeling, simulation, and game theory. Designed to present an overview of the more complex computer applications which have been designed to facilitate decision making. Prerequisites: T-EDP 108, T-EDP 205.

BUSINESS ADMINISTRATION



A.A.S. Degree Conferred

In North Carolina the opportunities in business are increasing. With the increasing population and industrial development in this State, business has become more competitive and automated. Better opportunities in business will be filled by students with specialized education beyond the high school level. The Business Administration Curriculum is designed to prepare the student for employment in one of many occupations common to business. Training is aimed at preparing the student in every phase of administrative work that might be encountered in the average business.

The specific objectives of the Business Administration Curriculum are to develop the following competencies:

1. Understanding of the principles of organization and management in business operations.
2. Understanding and skill in effective communication for business.
3. Knowledge of human relations as they apply to the successful operations in the rapidly expanding economy.

OCCUPATIONAL OPPORTUNITIES

The graduate of the Business Administration Curriculum may enter a variety of career opportunities from beginning sales person or office clerk to manager trainee. The duties and responsibilities of this graduate vary in different firms. These encompassments might include: making up and filing reports, tabulating and posting data in various books, sending out bills, checking calculations, adjusting complaints, operating various office machines, and assisting manager in supervising. Positions are available in businesses such as advertising; banking; credit; finance; retailing; wholesaling; hotel, tourist, and travel industry; insurance; transportation; and communications.

Course Title	*Class*	*Lab*	*Credit*
First Quarter			
T-ENG 101 Grammar	3	0	3
T-MAT 110 Business Mathematics	5	0	5
T-BUS 101 Introduction to Business	5	0	5
T-ECO 102 Economics	3	0	3
	16	0	16
Second Quarter			
T-ENG 102 Composition	3	0	3
T-BUS 120 Accounting	5	2	6
T-ECO 104 Economics	3	0	3
T-BUS 115 Business Law	3	0	3
T-BUS 123 Business Finance	3	0	3
	17	2	18

Course Title	*Class*	*Lab*	*Credit*
Third Quarter			
T-ENG 103 Report Writing	3	0	3
T-BUS 124 Business Finance	3	0	3
T-BUS 110 Office Machines	2	2	3
T-BUS 121 Accounting	5	2	6
T-BUS 116 Business Law	3	0	3
	16	4	18
Fourth Quarter			
T-ENG 204 Oral Communication	3	0	3
T-BUS 122 Accounting	5	2	6
T-BUS 232 Sales Development	3	0	3
T-BUS 239 Marketing	5	0	5
	16	2	17

Course Title	Class	Lab	Credit
Fifth Quarter			
T-EDP 104 Introduction to Data Processing Systems	3	2	4
T-BUS 225 Cost Accounting	3	2	4
T-ENG 206 Business Communication	3	0	3
T-SSC 201 Social Science	3	0	3
T-BUS 235 Business Management	3	0	3
	15	4	17
Sixth Quarter			
T-BUS 243 Advertising	3	2	4
T-SSC 202 Social Science	3	0	3
T-BUS 229 Taxes	3	2	4
T-BUS 272 Principles of Supervision	3	0	3
T-BUS 271 Office Management	3	0	3
	15	4	17
Seventh Quarter			
T-PSY 206 Applied Psychology	3	0	3
T-BUS 247 Business Insurance	5	0	5
T-BUS 233 Personnel Management	3	0	3
T-BUS 219 Credit Procedures and Problems	3	0	3
T-BUS 245 Retailing-Wholesaling	5	0	5
	19	0	19

Business Administration

Course Descriptions

T-BUS 101 INTRODUCTION TO BUSINESS

A survey of the business world with particular attention devoted to the structure of the various types of business organization, methods of financing, internal organization, and management. Prerequisite: None.

T-BUS 123 BUSINESS FINANCE

Financing of business units, as individuals, partnerships, corporations, and trusts. A detailed study is made of short-term, long-term, and consumer financing.

T-BUS 124 BUSINESS FINANCE

Financing, federal, state, and local government and the ensuing effects upon the economy. Factors affecting supply of funds, monetary and credit policies. Prerequisite: T-BUS 123.

T-BUS 232 SALES DEVELOPMENT

A study of retail, wholesale and specialty selling. Emphasis is placed upon mastering and applying the fundamentals of selling. Preparation for and execution of sales demonstrations required. Prerequisite: None.

T-BUS 239 MARKETING

A general survey of the field of marketing, with a detailed study of the functions, policies, and institutions involved in the marketing process. Prerequisite: None.

T-BUS 235 BUSINESS MANAGEMENT

Principles of business management including overview of major functions of management, such as planning, staffing, controlling, directing, and financing. Clarification of the decision-making function versus the operating function. Role of management in business—qualifications and requirements. Prerequisite: None.

T-BUS 243 ADVERTISING

The role of advertising in a free economy and its place in the media of mass communications. A study of advertising appeals; product and market research; selection of media; means of testing effectiveness of advertising. Theory and practice of writing advertising copy for various media. Prerequisite: None.

T-BUS 229 TAXES

Application of federal and state taxes to various businesses and business conditions. A study of the following taxes: income, payroll, intangible, capital gain, sales and use, excise, and inheritance. Prerequisite: T-BUS 121.

T-BUS 272 PRINCIPLES OF SUPERVISION

Introduces the basic responsibilities and duties of the supervisor and his relationship to superiors, subordinates, and associates. Emphasis on securing an effective work force and the role of the supervisor. Methods of supervision are stressed. Prerequisite: None.

T-BUS 271 OFFICE MANAGEMENT

Presents the fundamental principles of office management. Emphasis on the role of office management including its functions, office automation, planning, controlling, organizing and actuating office problems. Prerequisite: None.

T-BUS 247 BUSINESS INSURANCE

A presentation of the basic principles of risk insurance and their application. A survey of the various types of insurance is included. Prerequisite: None.

T-BUS 233 PERSONNEL MANAGEMENT

Principles of organization and management of personnel, procurement, placement, training, performance checking, supervision, remuneration, labor relations, fringe benefits and security. Prerequisite: None.

T-BUS 219 CREDIT PROCEDURES AND PROBLEMS

Principles and practices in the extension of credit; collection procedures; laws pertaining to credit extension and collection are included. Prerequisite: T-BUS 120.

T-BUS 245 RETAILING

A study of the role of retailing in the economy including development of present retail structure, functions performed, principles governing effective operation and managerial problems resulting from current economic and social trends. Prerequisite: None.

A.A.S. Degree Conferred

EXECUTIVE SECRETARIAL

The demand for better qualified secretaries in our ever-expanding business world is becoming more acute. The purpose of this curriculum is to outline a training program that will provide training in the accepted procedures required by the business world and to enable persons to become proficient soon after accepting employment in the business office.

Occupational Opportunities

The graduate of the Executive Secretary Curriculum should have a knowledge of business terminology, skill in dictation and accurate transcription of business letters and reports. The graduate may be employed as a stenographer or a secretary. Stenographers are primarily responsible for taking dictation and transcribing lettes, memoranda, or reports. The secretary, in addition to taking dictation and transcribing, is given more responsibility in connection with meeting office callers, screening telephone calls, and being an assistant to an executive. She may enter a secretarial position in a variety of offices in businesses such as insurance companies, banks, marketing institutions, and financial firms.

EXECUTIVE — SECRETARIAL

Course Title	*Class*	*Lab*	*Credit*
First Quarter			
T-ENG 101 Grammar	3	0	3
T-BUS 102 Typewriting	2	3	3
T-MAT 110 Business Mathematics	5	0	5
T-BUS 101 Introduction to Business	5	0	5
T-BUS 106 Shorthand	3	2	4
	18	5	20
Second Quarter			
T-ENG 102 Composition	3	0	3
T-BUS 103 Typewriting	2	3	3
T-BUS 107 Shorthand	3	2	4
T-BUS 120 Accounting	5	2	6
T-BUS 115 Business Law	3	0	3
	16	7	19

Course Title	*Class*	*Lab*	*Credit*
Third Quarter			
T-ENG 103 Report Writing	3	0	3
T-BUS 104 Typewriting	2	3	3
T-BUS 108 Shorthand	3	2	4
T-BUS 121 Accounting	5	2	6
	13	7	16
Fourth Quarter			
T-BUS 110 Office Machines	2	2	3
T-BUS 112 Filing	3	0	3
T-ENG 204 Oral Communication	3	0	3
T-BUS 206E Dictation and Transcription	3	2	4
T-BUS 205 Advanced Typewriting	2	3	3
	13	7	16

Fifth Quarter

Course Title	*Class*	*Lab*	*Credit*
T-BUS 211 Office Machines	2	2	3
T-EDP 104 Introduction to Data Processing Systems	3	2	4
T-BUS 207E Dictation and Transcription	3	2	4
T-BUS 214 Secretarial Procedures	3	2	4
T-SSC 201 Social Science	3	0	3
	14	8	18

Sixth Quarter

Course Title	*Class*	*Lab*	*Credit*
T-ENG 206 Business Communications	3	0	3
T-SSC 202 Social Science	3	0	3
T-BUS 208E Dictation and Transcription	3	2	4
T-BUS 271 Office Management	3	0	3
	12	2	13

Seventh Quarter

Course Title	*Class*	*Lab*	*Credit*
T-PSY 206 Applied Psychology	3	0	3
T-PSY 112 Personality Development	3	0	3
T-BUS 215E Office Application	6	0	6
TOECO 102 Economics	3	0	3
	15	0	15

EXECUTIVE — SECRETARIAL

Course Descriptions

T-BUS 102 TYPEWRITING

Introduction to the touch typewriting system with emphasis on correct techniques, mastery of the keyboard, simple business correspondence, tabulation, and manuscripts. Prerequisite: None.

T-BUS 106 SHORTHAND

A beginning course in the theory and practice of reading and writing shorthand. Emphasis on phonetics, penmanship, word families, brief forms, and phrases. Prerequisite: None.

T-BUS 103 TYPEWRITING

Instruction emphasizes the development of speed and accuracy with further mastery of correct typewriting techniques. These skills and techniques are applied in tabulation, manuscript, correspondence, and business forms. Prerequisite: T-BUS 102 or the equivalent. Speed requirement, 30 words per minute for five minutes.

T-BUS 107 SHORTHAND

Continued study of theory with greater emphasis on dictation and elementary transcription. Prerequisite: T-BUS 106 or the equivalent.

T-BUS 104 TYPEWRITING

Emphasis on production typing problems and speed building. Attention to the development of the student's ability to function as an expert typist, producing mailable copies. The production units are tabulation, manuscript, correspondence, and business forms. Prerequisite: T-BUS 103 or the equivalent. Speed requirement, 40 words per minute for five minutes.

T-BUS 108 SHORTHAND

Theory and speed building. Introduction to office style dictation. Emphasis on development of speed in dictation and accuracy in transcription. Prerequisite: T-BUS 107.

T-BUS 112 FILING

Fundamentals of indexing and filing, combining theory and practice by the use of miniature letters, filing boxes and guides. Alphabetic, Triple Check, Automatic, Geographic, Subject, Soundex, and Dewey Decimal filing. Prerequisite: None.

T-BUS 206E DICTATION AND TRANSCRIPTION

Develops the skill of taking dictation and of transcribing at the typewriter materials appropriate to the course of study, which includes a review of the theory and the dictation of familiar and unfamiliar material at varying rates of speed. Minimum dictation rate of 100 words per minute required for five minutes on new material. Prerequisite: T-BUS 108.

T-BUS 205 ADVANCED TYPEWRITING

Emphasis is placed on the development of individual production rates. The student learns the techniques needed in planning and in typing projects that closely approximate the work appropriate to the field of study. These projects include review of letter forms, methods of duplication, statistical tabulation, and the typing of reports, manuscripts and legal documents. Prerequisite: T-BUS 104. Speed requirement, 50 words per minute for five minutes.

T-BUS 211 OFFICE MACHINES

Instructions in the operation of the bookkeeping-accounting machines, duplicating equipment, and the dictating and transcribing machines. Prerequisite: T-BUS 110.

T-BUS 207E DICTATION AND TRANSCRIPTION

Covering materials appropriate to the course of study, the student develops the accuracy, speed, and vocabulary that will enable her to meet the stenographic requirements of business and professional offices. Minimum dictation rate of 110 words per minute required for five minutes on new material. Prerequisite: T-BUS 206.

T-BUS 214 SECRETARIAL PROCEDURES

Designed to acquaint the student with the responsibilities encountered by a secretary during the work day. These include the following: receptionist duties, handling the mail, telephone techniques, travel information, telegrams, office records, purchasing of supplies, office organization, and insurance claims. Prerequisite: None.

T-BUS 208E DICTATION AND TRANSCRIPTION

Principally a speed building course, covering materials appropriate to the course of study, with emphasis on speed as well as accuracy. Minimum dictation rate of 120 words per minute required for five minutes on new material. Prerequisite: T-BUS 207.

T-BUS 271 OFFICE MANAGEMENT

Presents the fundamental principles of office management. Emphasis on the role of office management including its functions, office automation, planning, controlling, organizing and actuating office problems. Prerequisite: None.

T-PSY 112 PERSONALITY DEVELOPMENT

Designed to help the student recognize the importance of the physical, intellectual, social, and emotional dimensions of personality. Emphasis is placed on grooming and methods of personality improvement. Prerequisite: None.

T-BUS 215E OFFICE APPLICATION

During the sixth quarter only, students are assigned to work in a business, technical, or professional office for six hours per week. The objective is to provide actual work experience for secretarial students and an opportunity for the practical application of the skills and knowledge previously learned, according to the course of study. Prerequisite: T-BUS 214, T-BUS 205, T-BUS 208, T-BUS 211.

School of Trades

The following areas of study are included in the School of Trades.

Tool and Die Making

Machine Shop

Welding

Automotive Mechanics

Air Conditioning-Refrigeration and Sheet Metal

Diesel Engines and Hydraulic Systems

Carpentry and Cabinet Making

Practical Nurse Education

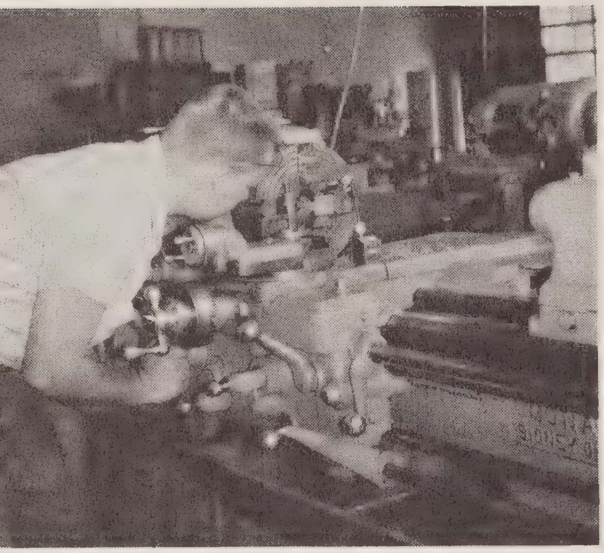
Radio and Television Servicing

The School of Trades will offer a variety of courses on a 4 quarter basis. The areas of study reflect the employment opportunities in the Western part of North Carolina. These curriculums require one full year for completion, with the exception of Welding. Welding is a nine months course. If a student elects to enroll in the School of Trades through extension because of his work load, the time required for completion will be doubled. The extension division will offer fifteen hours per week in a particular area of study. The full time schedule will require thirty hours per week.

The student enrolled in the School of Trades will spend most of his time in the shop working under actual industrial conditions. The rest of the time will be in the classroom and laboratory in related subjects. The School of Trades will require each student to demonstrate an ability to do work in his particular trade. Emphasis will be placed on becoming proficient in the use of machines, instruments, and other equipment related to a particular area of work.

Certain courses will be required of every student irrespective of his curriculum. These courses will enhance the student's ability to become a total individual with a proper attitude toward his work. A thorough understanding of the American system of Economics as it relates to the free enterprise system and corporate structure will be required of every student.

MACHINE SHOP



State Diploma Awarded

The two objectives of the machine shop course are to help men now in machine shops get a solid working knowledge of overall machine shop practice and to provide men not working in machine shops with a broad understanding of machine tools and shop practices. This course presents in a practical manner the details of such basic shop operations as bench work, layout, drilling, lathe work, milling, shaping, planing, broaching, and grinding. The course also covers the operating principles of machine tools, the use of measuring and testing instruments, and blueprint reading.

OCCUPATIONAL OPPORTUNITIES

Occupational opportunities are found in metal working factories, federal government installations, machine shops, maintenance shops, utility companies, and a wide variety of mechanical and technical activities.

MACHINIST — SUGGESTED CURRICULUM BY QUARTERS

First Quarter

Course Title	*Class*	*Lab*	*Credit*
MEC 1101 Machine Shop Theory and Practice	3	12	7
MAT 1101 Fundamentals of Mathematics	5	0	5
DFT 1104 Blueprint Reading: Mechanical	0	3	1
ENG 1101 Reading Improvement	2	0	2
PHY 1101 Applied Science	3	2	4
	13	17	19

Second Quarter

Course Title	*Class*	*Lab*	*Credit*
MEC 1102 Machine Shop Theory and Practice	3	12	7
MAT 1103 Geometry	3	0	3
DFT 1105 Blueprint Reading: Mechanical	0	3	1
PHY 1102 Applied Science	3	2	4
ENG 1102 Communication Skills	3	0	3
	12	17	18

Third Quarter

Course Title	*Class*	*Lab*	*Credit*
MEC 1103 Machine Shop Theory and Practice	3	12	7
MEC 1115 Treatment of Ferrous Metals	2	3	3
DFT 1106 Blueprint Reading: Mechanical	0	3	1
MAT 1104 Trigonometry	3	0	3
PSY 1101 Human Relations	3	0	3
	11	**18**	**17**

Fourth Quarter

Course Title	*Class*	*Lab*	*Credit*
MEC 1104 Machine Shop Theory and Practice	3	12	7
MEC 1116 Treatment of Non-Ferrous Metals	2	3	3
WLD 1101 Basic Gas Welding	0	3	1
MAT 1123 Machinist Mathematics	3	0	3
BUS 1105 Industrial Organizations	3	0	3
	11	18	17

MACHINE SHOP

Course Descriptions

MEC 1101 MACHINE SHOP THEORY AND PRACTICE

An introduction to the machinist trade and the potential it holds for craftsman. Deals primarily with the identification, care and use of basic hand tools and precision measuring instruments. Elementary layout procedures and processes of lathe, drill press, grinding (off-hand) and milling machines will be introduced both in theory and practice. Prerequisite: None.

MEC 1102 MACHINE SHOP THEORY AND PRACTICE

Advanced operations in layout tools and procedures, power sawing, drill press, surface grinder, milling machine shaper. The student will be introduced to the basic operations on the cylindrical grinder and will select projects encompassing all the operations, tools and procedures thus far used and those to be stressed throughout the course. Prerequisite: MEC 1101.

MEC 1103 MACHINE SHOP THEORY AND PRACTICE

Advanced work in the engine lathe, turning, boring and threading machines, grinders, milling machine and shaper. Introduction to basic indexing and terminology with additional processes on calculating, cutting and measuring of spur, helical, and worm gears and wheels. The trainee will use precision tools and measuring instruments such as vernier height gages, protractors, comparators, etc. Basic exercises will be given on the turret lathe and on the tool and cutter grinder. Prerequisites: MEC 1102.

MEC 1115 TREATMENT OF FERROUS METALS

Investigates the properties of ferrous metals and tests to determine their uses. Instructions will include some chemical metallurgy to provide a background for the understanding of the physical changes and causes of these changes in metals. Physical metallurgy of ferrous metals, producing iron and steel, theory of alloys, shaping and forming, heat treatments for steel, surface treatments, alloy of special steel, classification of steels, and cast iron will be topics for study. Prerequisite: None.

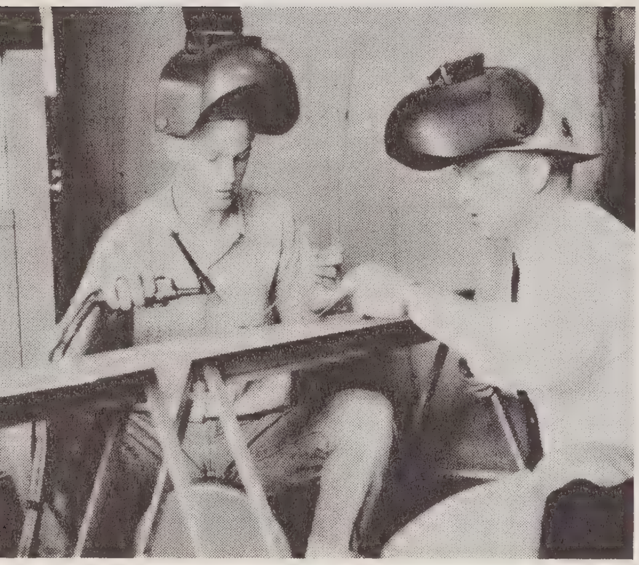
MEC-1104 MACHINE SHOP THEORY AND PRACTICE

Development of class projects using previously learned procedures in planning, blueprint reading, machine operations, final assembly and inspection. Additional processes on the turret lathe, tool and cutter grinder, cylindrical and surface grinder, advanced milling machine operations, etc. Special procedures and operations, processes and equipment, observing safety procedures faithfully and establishing of good work habits and attitudes acceptable to the industry. Prerequisites: MEC 1103.

MEC 1116 TREATMENT OF NON-FERROUS METALS

Continuation of the study of physical metallurgy. The non-ferrous metals: bearing metals, (brass, bronze, lead), light metals (aluminum and magnesium), and copper and its alloys are studied. Powder metalurgy, titanium, zirconium, indium and vanadium are included in this course. Prerequisite: MEC 1115.

WELDING



State Diploma Awarded

The purpose of this course is to provide a sound training program of the skills involved in welding along with a background of technical information needed by the modern welder.

The curriculum is designed to give the student a sound foundation in the principles, practices, and usages of both gas and electric welding in modern industry. At the same time he will be given ample practice in the welding skills. In the shop theory and practice are combined under the guidance of an instructor thoroughly competent in the trade. In addition, instruction is given in the technical fields related to welding under the instruction of specialists in the technical fields.

OCCUPATIONAL OPPORTUNITIES

Typical occupational opportunities are found in motor vehicle and equipment plants, air craft industry, construction companies, independent metal working repair shops, steel mills, and self-employment.

WELDING — SUGGESTED CURRICULUM BY QUARTERS

Course Title	*Class*	*Lab*	*Credit*
First Quarter			
WLD 1120 Oxyacetylene Welding and Cutting	3	12	7
MAT 1101 Fundamentals of Mathematics	5	0	5
DFT 1104 Blueprint Reading: Mechanical	0	3	1
PHY 1101 Applied Science	3	2	4
ENG 1101 Reading Improvement	2	0	2
	13	17	19
Second Quarter			
WLD 1121 Arc Welding	3	12	7
MAT 1103 Geometry	3	0	3
DFT 1117 Blueprint Reading: Welding	0	3	1
PHY 1102 Applied Science	3	2	4
ENG 1102 Communication Skills	3	0	3
	12	17	18

Course Title	*Class*	*Lab*	*Credit*
Third Quarter			
WLD 1124 Pipe Welding	3	12	7
WLD 1123 Inert Gas Welding	1	3	2
WLD 1112 Mechanical Testing and Inspection	1	3	2
DFT 1118 Pattern Development and Sketching	0	3	1
PSY 1101 Human Relations	3	0	3
	8	21	15
Fourth Quarter			
WLD 1122 Commercial and Industrial Practices	3	9	6
WLD 1125 Certification Practices	3	6	5
MEC 1112 Machine Shop Processes	0	6	2
BUS 1105 Industrial Organizations	3	0	3
	9	**21**	**16**

WELDING

Course Descriptions

WLD 1120 OXACETYLENE WELDING AND CUTTING

Introduction to the history of oxyacetylene welding, the principles of welding and cutting, nomenclature of the equipment, assembly of units. Welding procedures such as practice of puddling and carrying the puddle, running flat beads, butt welding in the flat, vertical and overhead position, brazing, hard and soft soldering. Safety procedures are stressed throughout the program of instruction in the use of tools and equipment. Students perform mechanical testing and testing and inspection to determine quality of the welds. Prerequisite: None.

WLD 1121 ARC WELDING

The operation of AC transformers and DC motor generator arc welding sets. Studies are made of welding heats, polarities, and electrodes for use in joining various metal alloys by the arc welding process. After the student is capable of running beads, butt and fillet welds in all positions are made and tested in order that the student may detect his weaknesses in welding. Safety procedures are emphasized throughout the course in the use of tools and equipment. Prerequisite: None.

WLD 1124 PIPE WELDING

Designed to provide practice in the welding of pressure piping in the horizonal, vertical, and horizontal fixed position using shielded metal arc welding processes according to Sections VIII and IX of the ASME code. Prerequisite: WLD 1121.

WLD 1123 INERT GAS WELDING

Introduction and practical operations in the use of inert-gas-shield arc welding. A study will be made of the equipment, operation, safety and practice in the various positions. A thorough study of such topics as: principles of operation, shielding gases, filled rods, process variations and applications, manual and automatic welding. Prerequisites: WLD 1120, WLD 1121.

WLD 1112 MECHANICAL TESTING AND INSPECTION

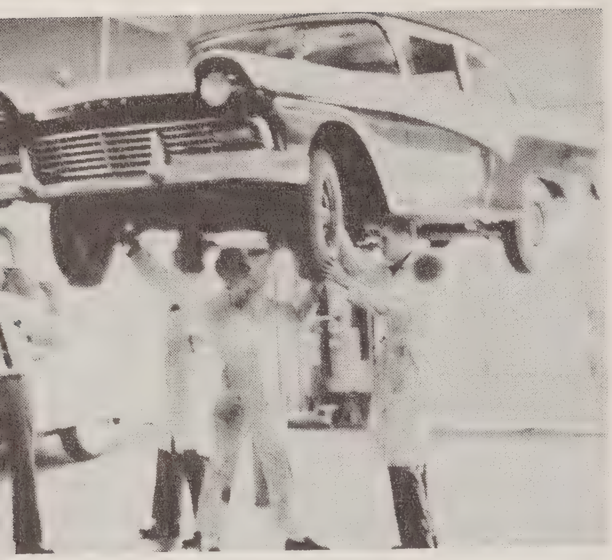
The standard methods for mechanical testing of welds. The student is introduced to the various types of tests and testing procedures and performs the details of the test which will give adequate information as to the quality of the weld. Types of tests to be covered are: bend, destructive, free-bend, guided-bend, nick-tear, notched-bend, tee-bend, nondestructive, V-notch, Charpy impact, etc. Prerequisites: WLD 1120, WLD 1121.

WLD 1122 COMMERCIAL AND INDUSTRIAL PRACTICES

Designed to build skills through practices in simulated industrial processes and techniques: sketching and laying out on paper the size and shape description, listing the procedure steps necessary to build the product, and then actually following these directions to build the product. Emphasis is placed on maintenance, repairing worn or broken parts by special welding applications, field welding and nondestructive tests and inspection. Prerequisites: WLD 1120, WLD 1121.

WLD 1125 CERTIFICATION PRACTICES

This course involves practice in welding the various materials to meet certification standards. The student uses various tests including the guided bend and the tensile strength tests to check the quality of his work. Emphasis is placed on attaining skill in producing quality welds. Prerequisites: WLD 1120, WLD 1121, WLD 1123, WLD 1124.



State Diploma Awarded

AUTOMOTIVE MECHANICS

This is a one-year program providing a thorough training in the theoretical as well as manual skills in servicing, testing, and diagnosing. All phases of the electrical system, the power plant, the power train, and the hydraulic braking system will be studied.

The courses are arranged in a sequence that gives the student the required technological and special courses as they are needed to coordinate his laboratory experiences.

Emphasis is placed on the mechanical parts and operation of the various automobile units. Trouble shooting and servicing of the live project are also stressed.

OCCUPATIONAL OPPORTUNITIES

Auto Mechanic, Truck and Bus Mechanic, Shop Foreman, Maintenance Supervisor, Dealer Service Manager, Sales Technician, Factory Representative, and Experimental Lab Work are among those occupational opportunities awaiting graduates of the Automotive Mechanics Curriculum.

AUTOMOTIVE — SUGGESTED CURRICULUM BY QUARTERS

Course Title	*Class*	*Lab*	*Credit*
First Quarter			
PME 1101 Internal Combustion Engines	3	12	7
MAT 1101 Fundamentals of Mathematics	5	0	5
ENG 1101 Reading Improvement	2	0	2
PHY 1101 Applied Science	3	2	4
	13	14	18
Second Quarter			
PME 1102 Engine Electrical and Fuel Systems	5	12	9
ENG 1102 Communication Skills	3	0	3
DFT 1101 Schematics and Diagrams: Power Mechanics	0	3	1
PHY 1102 Applied Science	3	2	4
	11	17	17

Course Title	*Class*	*Lab*	*Credit*
Third Quarter			
AUT 1123 Automotive Chassis and Suspensions Systems	3	9	6
AUT 1121 Braking Systems	3	3	4
PSY 1101 Human Relations	3	0	3
AHR 1101 Automotive Air Conditioning	2	3	3
WLD 1101 Basic Gas Welding	0	3	1
	11	18	17
Fourth Quarter			
AUT 1124 Automotive Power Train Systems	3	9	6
AUT 1125 Automotive Servicing	3	9	6
BUS 1103 Small Business Operations	3	0	3
	9	18	15

AUTOMOTIVE MECHANICS

Course Descriptions

PME 1101 INTERNAL COMBUSTION ENGINE

Development of a thorough knowledge and ability in using, maintaining, and storing the various hand tools and measuring devices needed in engine repair work. Study of the construction and operation of components of internal combustion engines. Testing of engine performance; servicing and maintenance of pistons, valves, cams and camshafts, fuel and exhaust systems, cooling systems; proper lubrication; and methods of testing, diagnosing and repairing. Prerequisite: None.

PME 1102 ENGINE ELECTRICAL AND FUEL SYSTEMS

A thorough study of the electrical and fuel systems of the automobile. Battery cranking mechanism, generator, ignition, accessories and wiring; fuel pumps, carburetors, and fuel injectors. Characteristics of fuels, types of fuel systems, special tools, and testing equipment for the fuel and electrical system. Prerequisite: PME 1101.

AUT 1123 AUTOMOTIVE CHASSIS AND SUSPENSION SYSTEMS

Principles and functions of the components of automotive chassis. Practical job instruction in adjusting and repairing of suspension, and steering systems. Units to be studied will be shock absorbers, springs, steering systems, steering linkage, and front end and alignment. Prerequisite: PME 1102.

AUT 1121 BRAKING SYSTEMS

A complete study of various braking systems employed on automobiles and light weight trucks. Emphasis is placed on how they operate, proper adjustment, and repair. Prerequisite: PHY 1102.

AHR 1101 AUTOMOTIVE AIR CONDITIONING

General introduction to the principles of refrigeration; study of the assembly of the components and connections necessary in the mechanisms, the methods of operation, and control; proper handling of refrigerants in charging the system. Prerequisite: PHY 1102.

AUT 1124 AUTOMOTIVE POWER TRAIN SYSTEMS

Principles and functions of automotive power train systems: clutches, transmission gears, torque converters, drive shaft assemblies, rear axles and differentials. Identification of troubles, servicing, and repair. Prerequisites: PHY 1102, AUT 1123.

AUT 1125 AUTOMOTIVE SERVICING

Emphasis is on the shop procedures necessary in determining the nature of troubles developed in the various component systems of the automobile. Troubleshooting of automotive systems, providing a full range of experiences in testing, adjusting, repairing and replacing. Prerequisites: AUT 1123, AUT 1121, AHR 1101.

AIR CONDITIONING AND REFRIGERATION

State Diploma Awarded

The purpose of this curriculum is to provide a broad background of the technical information and skills necessary to the technician in designing, installing, and maintaining refrigeration and conditioning systems.

The curriculum is designed to provide the student with good foundation in the theory and principles of refrigeration and comfort conditioning and at the same time, to give him a chance to experiment and receive practice in installing, maintaining, and repairing refrigeration and conditioning mechanisms and their controls. In the portion of the time devoted to the laboratory, theory and practice are correlated under the laboratory instructor. In addition, instruction is given in the technical fields related to this field.

OCCUPATIONAL OPPORTUNITIES

Occupational opportunities open to the graduate of this course of study are found most often in the areas of installation, service, inspection, sales, and in the growing fields of truck and trailer refrigeration and automobile air conditioning.

Course Title	*Class*	*Lab*	*Credit*
First Quarter			
AHR 1101 Elements of Refrigeration	5	6	7
DFT 1104 Blueprint Reading	0	3	1
MAT 1101 Fundamentals of Mathematics	5	0	5
ELC 1117 Basic Electricity	3	0	3
ENG 1101 Reading Improvement	2	0	2
WLD 1101 Basic Gas Welding	0	3	1
	15	12	19
Second Quarter			
AHR 1102 A.C. and Refrigeration	5	6	8
AHR 1103 Principles of Air Conditioning	5	0	5
ELC 1118 Applied Electricity	1	2	1
MAT 1103 Geometry	3	0	3
DFT 1105 Blueprint Reading	0	3	1
ENG 1102 Communication Skills	3	0	3
	17	11	21

Course Title	*Class*	*Lab*	*Credit*
Third Quarter			
AHR 1104 A.C. and Refrigeration	5	6	7
AHR 1105 All Year Comfort Systems	3	4	5
AHR 1106 Automatic Controls	2	0	2
PHY 1102 Applied Science	3	2	4
PSY 1101 Human Relations	3	0	3
	16	12	21
Fourth Quarter			
AHR 1107 A.C. and Refrigeration	3	6	6
AHR 1108 All Year Comfort Systems	3	2	4
MEC 1120 Sheet Metal and Duct Fabrication	3	4	4
PHY 1102 Applied Science	3	2	4
BUS 1105 Industrial Organization	3	0	3
	15	14	21

AIR CONDITIONING AND REFRIGERATION

Course Descriptions

AHR 1101 ELEMENTS OF REFRIGERATION

An introduction to the field and terminology of refrigeration. Topics to be included will be the basic laws of refrigeration; heat and the methods of heat transfer; use and care of servicing tools, equipment, tubing, and fittings; compressors; refrigerants and temperature controls; types of refrigerants; special testing and servicing equipment. Shop practice will be given in basic refrigeration and such operations as tube bending, flaring, swaging, soldering, identification and proper use of fittings and basic service testing equipment. Prerequisite: None.

AHR 1102 AIR CONDITIONING AND REFRIGERATION

Discussions, demonstrations and shop practice on residential cabinets using conventional, hermetic and absorption systems. Cabinet care, controls, system maintenance, and system replacement will be stressed. The student will prepare estimates and submit bids on practical projects involving the major types of domestic heating and air conditioning systems. Prerequisite: AHR 121.

AHR 1104 AIR CONDITIONING AND REFRIGERATION

Theory and practice in the installation and service of commercial refrigeration systems. Topics to be studied are the following: Commercial cabinets, walk-in coolers, display cases, frozen food cabinets, condensers, coils, control valves, methods of installation, removal and repair of components, and trouble shooting of systems. The student will prepare estimates and submit bids on practical projects involving the major types of commercial refrigeration systems. Prerequisite: AHR 122.

AHR 1103 PRINCIPLES OF AIR CONDITIONING

Included in this course will be the history, theory, and factors covering air conditioning. Instruction will also include temperature measurement, air movement humidity, psychometric properties, comfort zone, duct systems, air diffusion, air cleaning zone, and testing instruments. Practice in computing system loads, equipment sizing and balancing and the use of charts and tables pertaining to refrigeration equipment. Prerequisite: AHR 121.

AHR 1105 ALL YEAR COMFORT SYSTEMS

The student studies and receives practice in servicing and installing gas burners, electric heating elements and controls. The applications of various heating devices in liquid heating and controls are studied. Basic principles of installing hot water and low pressure boiler controls, pumps, and coils are covered and suitable installations developed. Prerequisites: AHR 122, 125.

AHR 1106 AUTOMATIC CONTROLS

Types of automatic controls and their function in air conditioning systems. Included in the course will be electric and pneumatic controls for domestic and commercial cooling and heating; zone controls; unit heater and ventilator controls; commercial fan system controls; commercial refrigeration controls; and radiant panel controls. Prerequisites: ELEC 118, AHR 122.

AHR 1107 AIR CONDITIONING AND REFRIGERATION

Practice in selecting, installing and servicing of air conditioning systems and accessories. Self contained and remote systems, automotive air conditioning, pumps, wiring, refrigeration piping, air distribution, and comfort zone control, reversing valves, special types of thermostatic expansion valves, systems of de-icing coils are included in this course. Heat pump installations are practiced and emphasis will be placed on correct practices of installation and servicing techniques. Prerequisite: AHR 123.

AHR 1108 ALL YEAR COMFORT SYSTEMS

A continuation of AHR 126 with further study of the servicing and installation of oil fired heating equipment. The various types of burners and their methods of operation, installation, and servicing. Practice will be given in the servicing of this equipment and their control devices. Prerequisite: AHR 126.

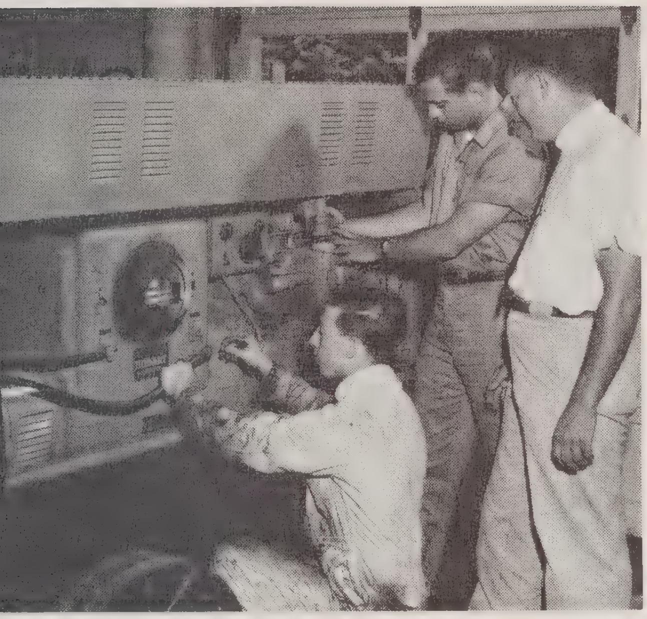
MECH 1120 SHEET METAL AND DUCT FABRICATION

Properties of various types of sheet metal will be included in the study of sheet metal fabrication. Safety, sheet metal hand tools, cutting and shaping machines, fasteners and fabrication practices, layout methods and the development of duct systems. The student will lay out, develop, fabricate, and install complete duct systems under practical working conditions. Prerequisite: DD 126, MA 120.

DIESEL ENGINES AND HYDRAULIC SYSTEMS

This curriculum is constructed to give each student a foundation in diesel engine and hydraulic systems and go into the areas of electrical, steering, fuel, suspension, cooling, and lubricating. The various types of power trains will be considered.

The area of heavy equipment maintenance offers a wide variety of occupational opportunities. This program will give a student the basic knowledge and the industry will provide the opportunity to apply this knowledge in a specific area of work. Preventative maintenance for all types of heavy equipment will be stressed throughout the entire course. Some knowledge of the operation of heavy equipment will be presented.



State Diploma Awarded

OCCUPATIONAL OPPORTUNITIES

Opportunities in heavy equipment maintenance will be found within Dealerships, Trucking Companies, Public Transportation Companies, General Contractors, Farm Implement Dealers, and industries that maintain heavy equipment.

Course Title	*Class*	*Lab*	*Credit*
First Quarter			
ENG 1101 Reading Improvement	3	0	3
MAT 1101 Fundamentals of Mathematics	5	0	5
PHY 1101 Applied Science	3	2	4
HEV 1101 Diesel Engine Theory and Practice	3	12	7
	14	14	19
Second Quarter			
ENG 1102 Communication Skills	3	0	3
PHY 1102 Applied Science	3	2	4
DFT 1101 Schematics and Diagrams: Power Mechanics	0	3	1
HEV 1102 Elementary Hydraulic Principles	1	3	2
HEV 1103 Diesel—Electrical, Fuel and Lubricating Systems	3	12	7
	10	20	17

Course Title	*Class*	*Lab*	*Credit*
Third Quarter			
PSY 1101 Human Relations	3	0	3
WLD 1101 Basic Gas Welding	2	3	3
HEV 1104 Diesel — Hydraulic Systems, Steering, Suspension, Braking, and Cooling Systems	3	15	8
	8	18	14
Fourth Quarter			
BUS 1103 Small Business Operations	3	0	3
HEV 1105 Diesel—Power Train Systems	3	6	5
HEV 1106 Diesel—Service and Repairs	3	15	8
	9	21	16

DIESEL ENGINES AND HYDRAULIC SYSTEMS

Course Description

HEV 1101 DIESEL ENGINE THEORY AND PRACTICE

This course is designed as an introduction to the most common types of diesel engines. Each student will be subjected to the principles and theory of the diesel engine and required to work with several different types of engines. As the engines are rebuilt the proper use of hand tools and instruments will be taught. Standard procedures will be used in all engine work. Methods of checking the various parts of the engines will be employed.

HEV 1102 ELEMENTARY HYDRAULIC PRINCIPLES

Students will be introduced to the principles of hydraulic systems as they apply in the heavy equipment area. The theory of hydraulic systems must be understood thoroughly before the students can progress into actual work on hydraulic systems. Various aspects of heavy equipment will be used to demonstrate these principles and theories.

HEV 1103 DIESEL—ELECTRICAL, FUEL AND LUBRICATING

This course continues from the engine course and will subject the student to the electrical system, fuel system, and lubricating systems. Each area will be treated as an individual unit. Each student will compare the various systems of Heavy Equipment. Preventive maintenance will be stressed in all areas. Types of fuel and the importance of pure and clean fuel will be taught. Tools, instruments, and machines related to these units will be presented.

HEV 1104 DIESEL—HYDRAULIC, STEERING, BRAKING

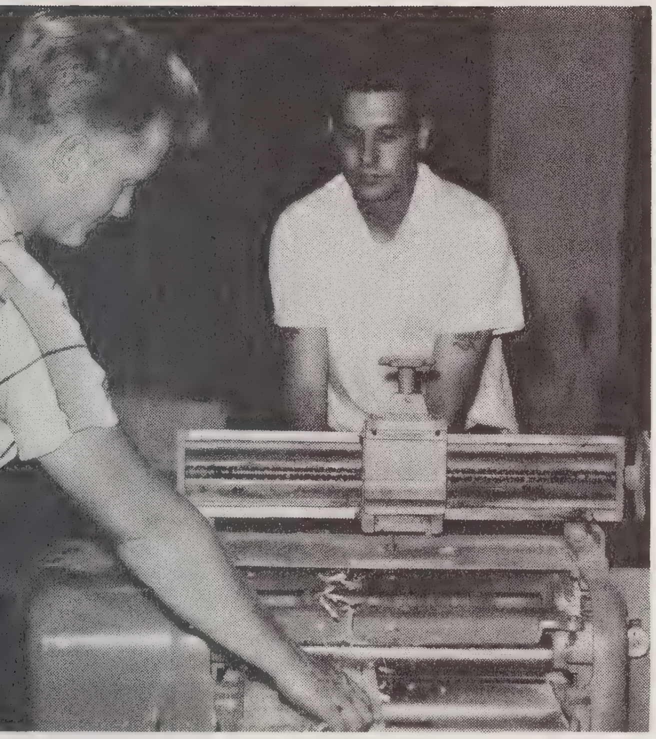
This course continues from the engine course and will advance the student into the actual hydraulic systems, steering, suspension, braking, and cooling systems. Each subject area will be treated as an individual unit taught separately. Each student will be required to study the difference in system on various pieces of equipment. Tools, machines, and instruments used in the various aspects of this work will be presented.

HEV 1105 DIESEL POWER TRAIN SYSTEMS

This course is designed to go into all types of power trains in heavy equipment. A study of the theory of power trains will be presented and applications of maintenance and repair will give each student an opportunity to review various types of power trains. Actual experience in the operation of power trains will be required to give each student an overview of a variety of experiences. Special tools and instruments used in maintenance and repair of power trains will be presented.

HEV 1106 DIESEL—SERVICE AND REPAIRS

This course is constructed to require students to utilize all tools, instruments, and machines for analysis of all aspects of service and repair. The procedures employed in service and repair will be the same as expected in the industry. Each student will be expected to show individual ability and initiative in determining the troubled area of heavy equipment.



State Diploma Awarded

CARPENTRY AND CABINET MAKING

This curriculum is designed to subject a student to the fundamentals of carpentry work and the basic procedures of cabinet making. Students will begin with hand tools and progress into the woodworking machines found in a cabinet shop. The carpentry work will begin with the masonry foundation and progress to the finished building. Some consideration will be given to industrial buildings as compared to residential buildings.

Each student will have an opportunity to review the work of other skilled tradesmen such as plumbing and heating, electrical, masonry, and painting and finishing.

With the tremendous population growth and expanding industry this area will serve a need that has unlimited potential.

OCCUPATIONAL OPPORTUNITIES

Occupational opportunities will be found with private builders, residential builders, general contractors, cabinet shops, and in many industries that maintain their own building.

Course Title	*Class*	*Lab*	*Credit*
First Quarter			
DFT 1104 Blueprint Reading	0	3	1
MAT 1101 Fundamentals of Mathematics	5	0	5
ENG 1101 Reading Improvement	2	0	2
CAB 1101 Cabinet Making I	5	12	9
	12	15	17
Second Quarter			
ENG 1102 Communication Skills	3	0	3
MAT 1103 Geometry	3	0	3
CAB 1102 Cabinet Making II	3	6	5
CAR 1101 Carpentry I	2	6	4
DFT 1105 Blueprint Reading	0	3	1
	11	15	16

Course Title	*Class*	*Lab*	*Credit*
Third Quarter			
PSY 1101 Human Relations	3	0	3
DFT 1127 General Drafting	2	3	4
MAT 1104 Trigonometry	3	0	3
CAR 1102 Plumbing	2	3	3
CAB 1103 Cabinet Making III	3	5	4
CAR 1103 Carpentry II	2	4	3
	15	15	20
Fourth Quarter			
CAR 1104 Materials and Finishes	2	3	3
CAB 1104 Cabinet Making IV	2	6	4
CAR 1105 Carpentry III	3	11	7
BUS 1103 Small Business Operations	3	0	3
	10	20	17

CARPENTRY AND CABINETMAKING

Course Descriptions

CAB 1101 CABINETMAKING I

This course is designed to introduce the student to hand tools used in a cabinet shop. After several projects with hand tools the student will be placed on each machine. Various types of wood will be used and identification of the various types of wood will be required.

CAB 1102 CABINETMAKING II

This course wil go into the necessary framing for cabinet work. Students will be presented a study of built in cabinets and pre-constructed cabinet work. Built in book cases and special work will be presented.

CAR 1101 CARPENTRY I

This course will be presented as an introduction to the first steps necessary from the finished foundation to the complete framing of a building. Methods of framing entire walls before erection will be presented. Motion saving methods and overall planning of time will be presented. Size of nails and identification of nails will be studied.

CAR 1102 PLUMBING AND HEATING SYSTEMS

This particular course is designed to help the carpenter understand the types of plumbing and heating systems that are used in modern building construction. The requirements to special framing on the part of the carpenter will be practiced.

CAB 1103 CABINETMAKING III

This course will progress into the various woods used in cabinetmaking. Drawers, doors, hardware, and cornice work will be practiced. Methods of finishing and types of finishes will be studied.

CAR 1103 CARPENTRY II

In this course the students will study all types of roof construction. Each student will be required to cut and assemble all type of rafters. Students will be required to put on all types of shingles and prepare a roof for "built up construction". The students will also be required to study the framing square in order to figure the length of rafters and other materials.

CAR 1104 MATERIALS AND FINISHES

This course will present an identification and selection of materials. Methods and types of external finishes will be presented. Types of doors, windows, and external siding will be presented. Each student will be required to frame, stop and lock, doors and windows.

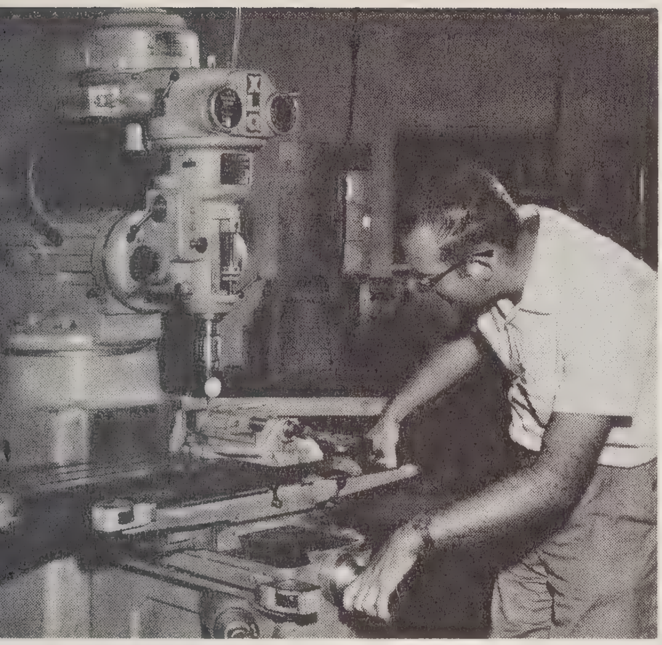
CAB 1104 CABINETMAKING IV

This is a study of the type of materials used on tops and other finished areas. Each student will study built in appliances such as stoves, ovens, dishwashers, and refrigerators. Finished cornice and standard measurements of all cabinet work will be presented.

CAR 1105 CARPENTRY III

This course will present the student with the finish work of carpentry. Types of baseboard, moulding, door facing, and framing and finishing stair cases will be presented. Each student will be subjected to aseries of projects under close supervision that will require use of all finishing tools normally used by a carpenter. Clean work and self pride will have an emphasis in this course.

TOOL AND DIE MAKING



State Diploma Awarded

The Tool and Die maker is the foundation man of many industries. This individual is highly skilled and possesses a tremendous depth of technical knowledge. This curriculum is designed to start an advanced machinist into the elementary requirement of tool and die making and progress into more complex dies, jigs and fixtures, gauges, and other areas.

This course will enable the advanced machinist to compare the machines found in a tool and die shop with those found in an average machine shop. Each student will be required to become highly proficient in the use of each machine used in Tool and Die Making. The related courses are designed to give the student an opportunity to advance his knowledge in mathematics, strength of materials, drafting, and hydraulics and pneumatics.

OCCUPATIONAL OPPORTUNITIES

Occupational opportunities are found in metal working industries, government installations, machine shops, maintenance shops, and a wide variety of other industries that have repetetive production of products.

Course Title	*Class*	*Lab*	*Credit*
Fifth Quarter			
MEC 1201 Machine Processes	3	12	7
MAT 1203 Trigonometry	3	0	3
DFT 1207 Drafting-Mechanical	3	6	5
	9	18	15
Sixth Quarter			
MEC 1202 Machine Processes	3	12	7
MEC 1203 Metallurgy	2	3	3
DFT 1208 Drafting and Descriptive Geometry	2	3	3
MAT 1204 Compound Angles and Curves	3	0	3
	10	18	16

Course Title	*Class*	*Lab*	*Credit*
Seventh Quarter			
MEC 1204 Machine Processes	2	10	5
MEC 1205 Strength of Materials	5	0	5
PHY 1204 Mechanisms	5	0	5
PHY 1205 Hydraulics and Pneumatics	3	0	3
ELC 1201 Electricity-Industrial	2	3	3
	17	13	21
Eighth Quarter			
MEC 1206 Machine Processes	3	12	7
DFT 1212 Tool Design	2	6	4
MEC 1207 Special Problems and Injection Molding	3	4	5
	8	22	16

TOOL & DIE MAKING

Course Description

MEC 1201 MACHINE PROCESSES

This course is designed to introduce the student to the tools, instruments, and machines used in the tool and die shop. The student will compare the machines used in production with those used in tool and die making. The student will become familiar with jigs and fixtures and their applications pertaining to production machining. Each student will be subjected to a series of projects that will require extreme proficiency.

MAT 1203 TRIGONOMETRY

A basic review of mathematics will form a foundation for a study of tarigonometry of right triangles, vectors, coordinate systems, logarithmic and dimensional analysis. Applications to typical problems found in the tool and die shop will be presented and solutions will be found by using mathematics.

DFT 1207 DRAFTING

An introductory course in drafting for students needing a knowledge of drawing principles and practices for reading and describing objects in the graphic language. The student is expected to gain basic skills in drawing with instruments, geometrical construction, freehand sketching, and describing objects orthographically with principal views and sections.

MEC 1202 MACHINE PROCESSES

Advanced operations of the tool and die ship, utilizing all machines. A study of shearing, punching, forming, and drawing dies will be presented. The student will receive instructions on gauging practices and its application to the finished product, and will become familiar with various types of guaging procedures. Each student will work individually on a series of projects, gaining proficiency and knowledge of the various types of tools and dies found in industry.

MEC 1203 METALLURGY

Properties of metals and various methods of changing these properties, classification of metals, powder metallurgy, and factors contributing to production and selection of metals will be presented. Chemical finishes, electroplating, and other methods of finishing or treating metals will be areas of study.

DFT 1208 DRAFTING AND DESCRIPTIVE GEOMETRY

A complete and thorough knowledge of tool and die prints will be required of all students. Industrial prints will be used in this course. The difference between production drawings or operation sheets and tools drawing will be presented. Assembly drawings as the piece fits into place will be broken down into each detail print required.

MAT 1204 COMPOUND ANGLES AND CURVES

The application of trigonometry and geometry will be presented to solve compound angles. This course will use as many practical problems as possible to enable the student to work with typical problems in compound angles and curves without points of generation.

MEC 1204 MACHINE PROCESSES

This course will present a study of progressive dies typical of the operations found in the average industry. Step by step tooling used to transform raw material into a finished working part will be studied. Total utilization of all machines and instruments will be required. Application of hydraulic systems, air operated systems, pneumatic systems, and electronic controls and cycle devices will be presented. Emphasis will be placed on proper holding locations for machinig and gauging finished parts.

MEC 1205 STRENGTH OF MATERIALS

A study of stresses and shears that occur in materials when subjected to tensile, compressive, and/or shearing forces. Stresses in thin walled cylinders, riveted and welded joints, shear and bending moment diagrams, deflection, eccentrically applied loads, torsion, and factors of column design will be emphasized.

PHY 1204 MECHANISMS

This course consists of an application of mathematics and drafting room procedures to the solution of problems involving the principles of machine elements. A study of motions of linkages, velocities, and acceleration of points within a link mechanism, and layout methods for designing cams, belting, pulleys, gear and gear trains will be presented.

PHY 1205 HYDRAULICS AND PNEUMATICS

A basic theory of hydraulics and pneumatics systems and their combinations in various circuits. Function and basic design of circuits and motors, controls, electrohydraulic servo elements, syncro elements, and air operated systems will be presented. Automated systems of productions utilizing dies, tools, gauges, jigs and fixtures will be considered.

MEC 1206 MACHINE PROCESSES

This course will be used to review various processes of tool and die work, jigs and fixtures and gauging. Consideration of the production desired will be used to select the proper systems. Each student will work individually on different processes or systems utilizing all machines, instruments, and tools in tool and die making.

DFT 1212 TOOL DESIGN

This course will enable the student to plan the process of production and isolate the areas that must be tooled for production. Cost of tools, die work, jig and fixtures, and gauging will be considered. Students will review available items from vendors and utilize standard bushing charts and other references. Typical tool design procedures will be employed and prints must reflect standard procedures.

MEC 1207 SPECIAL PROBLEMS

This course will be used to subject the student to special problems within local industries. Numerous field trips will be scheduled for individual and groups to review installation of systems, development of dies, tools, jigs and fixtures, and gauging. Each student will be required to follow one complete system from the design stage through to production. Special procedures of die casting, sand casting, shell molding, injection molding, hydro forming, and others will be presented.

State Diploma Awarded

PRACTICAL NURSE EDUCATION

INTRODUCTION

The accelerated growth of population in North Carolina and rapid advancement in medical technology demand an increased number of well-trained personnel for health services. Realizing this need, the State Department of Community Colleges, in conjunction with local hospitals, administraters programs of practical nurse education in local school systems, community colleges, technical institutes and in industrial education centers throughout the state.

The aim of the Practical Nurse Education Program is to make available to qualified persons the opportunity to prepare for participation in care of patients of all ages, in various states of dependency, and with a variety of illness conditions.

Students are selected on the basis of demonstrated aptitude for nursing as determined by pre-entrance tests, interviews with faculty members, high school record, character references, and reports of medical and dental examination.

Throughout the one-year program the student is expected to grow continuously in acquisition of knowledge and understandings related to nursing, the biological sciences, the social sciences and in skills related to nursing practice, communications, interpersonal relations ,and use of good judgment. Evaluation of student performance consists of tests on all phases of course content, evaluation of clinical performance, and evaluation of adjustment to the responsibilities of nursing. A passing score is required on all graded work, plus demonstrated progress in application of nursing skills to actual patient care.

Graduates of accredited programs of practical nurse education are eligible to take the licensing examination given by the North Carolina Board of Nursing. This examination is given twice each year, usually in April and September. A passing score entitles the individual to receive a license and to use a legal title "Licensed Practical Nurse." The license must be renewed annually. The Licensed Practical Nurse can apply for licensure in other states on the basis of a satisfactory examination score, without repeating the examination.

OCCUPATIONAL OPPORTUNITIES

The LPN is prepared to function in a variety of situations: hospitals of all types, nursing homes, clinics, doctor's and dentists' offices and, in some localities, public health facilities. In all situations the LPN functions under supervision of a registered nurse and/or licensed physician. This supervision may be minimal in situations where the patient's condition is stable and ont complex; or it may consist of continuous direction in situations requiring the knowledge and skills of the registered nurse or physician. In the latter situation, the LPN may function in an assisting role in order to avoid assuming responsibility beyond that for which the one-year program can prepare the individual.

Job requirements for the Licensed Practical Nurse include suitable personal characteristics, ability to adapt knowledge and understandings of nursing principles to a variety of situations, technical skills for performance of bedside nursing, appreciation for differences of people and for the worth of every individual, a desire to serve and help others, and readiness to conform to the requirements of nursing ethics and hospital policies.

PRACTICAL NURSE EDUCATION

	Class	Lab.	Clinic	Quarter Hours Credit
First Quarter				
Practical Nursing I	18	2	3	20
Second Quarter				
Practical Nursing II	12	2	21	20
Third Quarter				
Practical Nursing III	10	2	24	19
Fourth Quarter				
Practical Nursing IV	10	2	24	19
Totals				78

PRACTICAL NURSE EDUCATION

PRACTICAL NURSING I

COURSE DESCRIPTIONS

COURSE MATERIAL: Nursing—History
Introduction to patient care

Health—Personal, physical and mental
Family
Community

Basic Science—Body structure and function
Bacteriology
Basic nutrition

Vocational Adjustments—Introduction to ethics and legal aspects of nursing

Communications and Human Relations

Classroom activities are planned to assist students in development of knowledge, understanding, appreciations, and attitudes basic to effective nursing of patients of all ages and backgrounds with nursing needs arising both from the individuality of the patient and from inability for self-care as a result of a health deviation. The student is encouraged to develop beginning skills in analysis of patient needs, both through classroom study of hypothetical patient situations and through planned patient experiences in the clinical environment. Beginnnig skills in nursing methods are developed through planned laboratory experiences, followed by related practice in actual patient care.

Clinical activities provide introduction to actual patient care through selected clinical assignments requiring application of current classroom and laboratory learnings.

PREREQUISITE: Admission requirements.

PRACTICAL NURSING II

COURSE MATERIAL: Medical-Surgical Nursing—Patients care
Therapeutic Methods, including administration of oral medication.

Introduction to Maternity Nursing

Introduction to Nursing the Sick Child

Communications and Human Relations

Classroom activities center around analysis of nursing needs as viewed in perspective with the needs arising from the individuality of the patient and from the illness condition. Related information is presented as it is levelant to the student's understanding of and ability to meet nursing needs of patients.

Clinical activities provide selected experiences in patient care in order for the student to develop skill in applying classroom learnings to a variety of patient situations.

PREREQUISITE: Practical Nursing I.

PRACTICAL NURSING III

COURSE MATERIAL: Common Medical-Surgical Conditions

Care of the Subacutely Ill Child

Care of Maternity Patient and Newborn Infant With Complications

Classroom activities center around analysis of nursing needs arising from the specific illness condition and the medical plan.

Clinical activities cnosist of guided experiences in nursing patients with conditions which illustrate classroom learnings.

PREREQUISITE: Practical Nursing II.

PRACTICAL NURSING IV

COURSE MATERIAL: Needs of the Seriously Ill Patient

Needs of Patients in Immediate Post-Operative Period

Needs of Labor Patient

Needs of the Seriously Ill Child

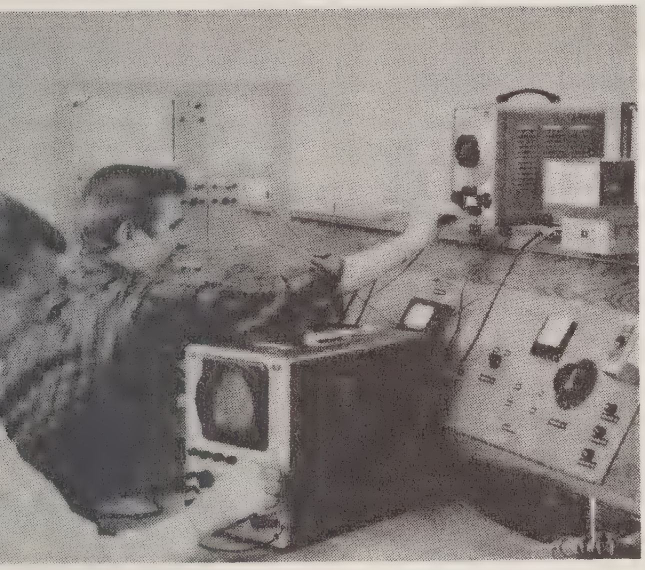
Assuming the Role of Graduate Practical Nurse

Classroom activities center around the needs of seriously ill patients of all ages, of labor patients, and of patients immediately following surgery.

Clinical activities consist of guided experiences in the care of seriously ill patients, labor patients, and surgery patients, and is planned to parallel classroom learnings whenever possible.

PREREQUISITE: Practical Nursing III.

RADIO AND TELEVISION SERVICING



This curriculum is designed to fill the tremendous need for radio and television repairmen. With the number of televisions increasing every year, the need for individuals to service and install these receivers is also increasing every year. This particular curriculum will start with the basic information as a foundation on which the advance courses are established. The individuals enrolled in the school of radio and television repair will spend over half of their time in the laboratory with typical servicing and installation problems found in the field of work.

OCCUPATIONAL OPPORTUNITIES

Radio Serviceman, Television Serviceman, Radio and Television Salesman, Installation, and Manufacturer Representative.

First Quarter

Course Title	*Class*	*Lab*	*Credit*
MA 1101 Fundamentals of Mathematics	5	0	5
ENG 1101 Reading Improvement	2	0	2
ELC 1101 Direct and Alternating Current	7	11	11
	14	11	18

Second Quarter

Course Title	*Class*	*Lab*	*Credit*
MAT 1105 Electrical Mathematics	5	0	5
ENG 1102 Communication Skills	3	0	3
ELC 1102 Amplifier Systems	2	6	4
ELC 1103 Vacuum Tubes and Circuits	5	9	9
	15	15	21

Third Quarter

Course Title	*Class*	*Lab*	*Credit*
PSY 1101 Human Relations	3	0	3
ELC 1104 Vacuum Tubes and Circuits	4	4	6
ELC 1105 Radio Receiver Servicing	2	6	4
ELC 1106 Television Receiver Circuits	5	6	7
	14	16	20

Fourth Quarter

Course Title	*Class*	*Lab*	*Credit*
ELC 1108 Television Receiver Circuits and Servicing	5	10	8
ELC 1107 Television Servicing-Color	4	6	7
BUS 1103 Small Business Operations	3	0	3
	12	16	18

RADIO AND TELEVISION SERVICING

Course Descriptions

ELC 1101 DIRECT AND ALTERNATING CURRENT

A study of the structure of matter and the electron theory, the relationship between voltage, current and resistance in series, parallel and series-parallel circuits. Analysis of direct current by Ohm's law and Kirchhoff's law; sources of direct current potentials. Fundamental concepts of alternating current flow; a study of reactance, impedance, phase angle, power and resonance and alternating current circuit analysis.
Prerequisite: None.

ELC 1103 VACUUM TUBES AND CIRCUITS

An introduction to vacuum tubes and their development; the theory, characteristics and operation of vacuum diodes, semi-conductor diodes, rectifier circuits, filter circuits, triodes and simple voltage amplifier circuits.

ELC 1102 AMPLIFIER SYSTEMS

An introduction of commonly used servicing techniques as applied to monophonic and stereophonic high fidelity amplifier systems and auxiliary equipment. The operation and servicing of intercommunication amplifiers and switching circuits will also be taught.

ELC 1104 VACUUM TUBES AND CIRCUITS

A continuing study of tubes and circuits; the theory, characteristics, and operation of the tetrode and pentode tubes, voltage and power amplifiers, tunable RF amplifiers, oscillators and demodulator circuits.

ELC 1105 RADIO RECEIVER SERVICING

Principles of radio reception and practices of servicing; included are block diagrams of radio receivers, servicing techniques of AM and FM receivers by resistance measurements, signal injection, voltage analysis, oscilloscope methods of locating faulty stages and components, and the alignment of AM and FM receivers.

ELC 1106 TELEVISION RECEIVER CIRCUITS

A study of principles of television receivers, alignment of radio and intermediate frequency amplifiers, adjustment of horizontal and vertical sweep circuits will be taught. Techniques of trouble shooting and repair of TV receivers with the proper use of associated test equipment will be stressed. Additional study of more specialized servicing techniques and oscilloscope waveform analysis will be used in the adjustment, trouble-shooting and repair of the color television circuits.

ELC 1108 TELEVISION RECEIVER CIRCUITS

This course, taught in conjunction with an elective will be a shortened version of ELN 127.

ELC 1107 TELEVISION SERVICING-COLOR

A study of the service techniques required for color television circuits.

RELATED COURSES

Course Descriptions

T-ENG 101 GRAMMAR

Designed to aid the student in the improvement of self-expression in grammar. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English grammar in their day-to-day situations in industry and social life. Prerequisite: None.

T-ENG 102 COMPOSITION

Designed to aid the student in the improvement of self-expression in business and technical composition. Emphasis is on the sentence, paragraph and whole composition. Prerequisite: T-ENG 101.

T-ENG 103 REPORT WRITING

The fundamentals of English are utilized as a background for the organization and techniques of modern report writing. Exercises in developing typical reports, using writing techniques and graphic devices are completed by the students. Practical application in the preparation of a full-length report is required of each student at the end of the term. This report must have to do with something in his chosen curriculum. Prerequisite: T-ENG 102.

T-ENG 204 ORAL COMMUNICATION

A study of basic concepts and principles of oral communications to enable the student to communicate with others. Emphasis is placed on the speaker's attitude, improving diction, voice, and the application of particular techniques of theory to correct speaking habits and to produce effective oral presentaion. Particular attention given to conducting meetings, conferences, and interviews. Prerequisite: T-ENG 101.

T-ENG 206 BUSINESS COMMUNICATION

Develops skills in techniques in writing business communications. Emphasis is placed on writing action—getting sales letters and prospectuses. Business reports, summaries of business conferences, letters involving credit, collections, adjustments, complaints, orders, acknowledgements, remittances, and inquiry. Prerequisite: T-ENG 102.

ENG 1101 READING IMPROVEMENT

Designed to improve the student's ability to read rapidly and accurately. Special machines are used for class drill to broaden the span of recognition, to increase eye coordination and word group recognition and to train for comprehension in larger units. Prerequisite: None.

ENG 1102 COMMMUNICATION SKILLS

Designed to promote effective communication through correct language usage in speaking and writing. Prerequisite: ENG 1101.

T-ECO 102 ECONOMICS

The fundamental principles of economics including the institutions and practices by which people gain a livelihood. Included is a study of the laws of supply and demand and the principles bearing upon production, exchange, distribution, and consumption both in relation to the individual enterprise and to society at large. Prerequisite: None.

T-ECO 104 ECONOMICS

Greater depth in principles of economics, including a penetration into the composition and pricing of national output, distribution of income, international trade and finance, and current economic problems. Prerequisite: T-ECO 102.

T-SSC 201 SOCIAL SCIENCE

An integrated course in the social sciences, drawing from the fields of anthropology, psychology, history, and sociology. Prerequisite: None.

T-SSC 202 SOCIAL SCIENCE

A further study of social sciences with emphasis on economics, political science, and social problems as they relate to the individual. Prerequisite: T-SSC 201.

T-PSY 206 APPLIED PSYCHOLOGY

A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community. Prerequisite: None.

PSY 1101 HUMAN RELATIONS

A study of basic principles of human behavior. The problems of the individual are studied in relation to society, group membership, and relationships within the work situation. Prerequisite: None.

BUS 1105 INDUSTRIAL ORGANIZATIONS

Methods, techniques, and practices of modern management in planning, organizing and controlling operations of a manufacturing concern. Introduction to the competitive system and the factors constituting product cost. Prerequisite: None.

BUS 1103 SMALL BUSINESS OPERATIONS

An introduction to the business world, problems of small business operation, basic business law, business forms and records, financial problems, ordering and inventorying, layout of equipment and offices, methods of improving business, and employer-employee relations. Prerequisite: None.

T-BUS 110 OFFICE MACHINES

A general survey of the business and office machines. Students will receive training in techniques, processes, operation and application of the ten-key adding machines, full keyboard adding machines, and calculator. Prerequisite: None.

T-BUS 115 BUSINESS LAW

A general course designed to acquaint the student with certain fundamentals and principles of business law, including contracts, negotiable instruments, and agencies. Prerequisite: None.

T-BUS 116 BUSINESS LAW

Includes the study of laws pertaining to bailments, sales, risk-bearing, partnership-corporation, mortgages, and property rights. Prerequisite: T-BUS 115.

T-EDP 104 INTRODUCTION TO DATA PROCESSING SYSTEMS

Fundamental concepts and operational principles of data processing systems, as an aid in developing a basic knowledge of computers, prerequisite to the detail study of particular computer problems. This course is a prerequisite for all programming courses. Prerequisite: None.

T-DFT 101 TECHNICAL DRAFTING

The field of drafting is introduced as the student begins study of drawing principles and practices for print reading and describing objects in the graphic language. Basic skills and techniques of drafting included are: use of drafting equipment, lettering, freehand orthographic and pictorial sketching, geometric construction, orthographic instrument drawing of principal views, and standards and practices of dimensioning. The principles of isometric, oblique, and perspective are introduced. Prerequisite: None.

T-DFT 102 TECHNICAL DRAFTING

The application of orthographic projection principles to the more complex drafting problems, primary and secondary auxiliary views, simple and successive revolutions, and sections and conventions will be studied. Most important is the introduction of the graphical analysis of space problems. Problems of practical design elements involving points, lines, planes, and a combination of these elements shall be studied. Dimensioning practices, approved by the American Standards Association will also be included. Introduction is given to intersections and developments of various types of geometrical objects. Prerequisite: T-DFT 101.

T-DFT 211 MECHANISMS

Mathematical and drafting room solutions of problems involving the principles of machine elements. Study of motions of linkages, velocities and acceleration of points within a link mechanism; layout, methods for designing cams, belts, pulleys, gears and gear trains. Prerequisites: T-DFT 201 & 204, T-MAT 103, T-PHY 106.

T-DFT 212 JIG AND FIXTURE DESIGN

Commercial standards, principles, practices and tools of jig and fixture design. Individual project and design work to acquaint students with the types of jigs and fixtures and their design. Prerequisites: T-DFT 205, T-DFT 211.

DFT 1101 SCHEMATICS & DIAGRAMS: POWER MECHANICS

Interpretation and reading of blueprints. Development of ability to read and interpret blueprints, charts, instruction and service manuals, and wiring diagrams. Information on the basic principles of lines, views, dimensioning procedures, and notes. Prerequisite: None.

DFT 1104 BLUEPRINT READING: MECHANICAL

Interpretation and reading of blueprints. Information on the basic principles of the blueprint; lines, views, dimensioning procedures and notes. Prerequisite: None.

DFT 1105 BLUEPRINT READING: MECHANICAL

Further practice in interpretation of blueprints as they are used in industry; study of prints supplied by industry; making plans of operations; introduction to drafting room procedures; sketching as a means of passing on ideas, information and processes. Prerequisite: DFT 1104.

DFT 1106 BLUEPRINT READING: MECHANICAL

Advanced blueprint reading and sketching as related to detail and assembly drawings used in machine shops. The interpretation of drawings of complex parts and mechanisms for features of fabrication, construction and assembly. Prerequisite: DFT 1105.

DFT 1117 BLUEPRINT READING: WELDING

A thorough study of trade drawings in which welding procedures are indicated. Interpretation, use and application of welding symbols, abbreviations, and specifications. Prerequisite: DFT 1104.

DFT 1118 PATTERN DEVELOPMENT AND SKETCHING

Continued study of welding symbols; methods used in layout of sheet steel; sketching of projects, jigs and holding devices involved in welding. Special emphasis is placed on developing pipe and angle layouts by the use of patterns and templates. Prerequisite: None.

T-MEC 210 PHYSICAL METALLURGY

Introductory course in metallurgy, a basic study of the properties of metals and alloys. Analysis of the structure of metals and alloys, atomic structure, nuclear structure, and nuclear reactions. Solid (crystalline) structures, methods, methods of designating crystal planes; liquid and vapor phases; phase diagrams; and alloy systems. Prerequisite: T-PHY 101.

T-ELC 201 ELECTRICAL MACHINERY

A course in the basic understanding and application of electricity to modern industrial machinery. Included in a study of direct current motors, motor controls and protecting devices, transformers, and the industrial applications of this equipment. Prerequisite: T-PHY 103.

T-MEC 205 STRENGTH OF MATERIALS

Study of principles and analysis of stresses which occur within machine and structure elements subjected to various types of loads such as static, impact, varying and dynamic. Analyses of these stresses are made as applied to thin-walled cylinders and spheres, riveted and welded joints, beams, columns and machine components. Prerequisites: T-PHY 106, T-MAT 102.

T-MEC 235 HYDRAULICS AND PNEUMATICS

The basic theories of hydraulic and pneumatic systems. Combinations of systems in various circuits. Basic designs and functions of circuits and motors, controls, electrohydraulic servomechanisms, plumbing, filtration, accumulators and reservoirs. Prerequisite: T-PHY 102.

T-ELN 201 INDUSTRIAL CONTROLS

Industrial controls is the study of modern methods of controlling machinery by electronic circuitry. Machinery controls and electronic mechanisms that automatically operate machines will be studied. Types of motors, generators, control signals and devices, thyratrons, gates, switches, and servomechanism circuits are major areas of study. Prerequisite: T-PHY 103.

WLD 1101 BASIC GAS WELDING

Welding demonstrations by the instructor and practice by students in the welding shop. Safe and correct methods of assembling and operating the welding equipment. Practice will be given for surface welding; bronze welding, silver-soldering, and flame-cutting methods applicable to mechanical repair work. Prerequisite: None.

T-MEC 214 TOOL ENGINEERING

An introduction to the problems of tool engineering with emphasis on planning the processes of production, designing and developing the necessary tools, and utilizing available manufacturing facilities; practical analysis and comparison of the use and costs of tools, jigs and fixtures, dies, molds, and gauges as they are utilized in our modern day manufacturing and production methods. Prerequisites: T-DFT 102, T-MEC 201.

T-MEC 116 ENGINEERING MATERIALS

Study and testing of the properties of ferrous and non-ferrous metals and plastics, load and strain measurements, behavior of materials under load, qualities other than strength and control of the properties of the materials. Prerequisite: T-PHY 102.

T-ELC 201 ELECTRICAL MACHINERY

A course in the basic understanding and application of electricity to modern industrial machinery. Included is a study of direct current motors, motor controls and protecting devices, transformers, and the industrial applications of this equipment. Prerequisite: T-PHY 103.

T-PHY 101 PHYSICS: PROPERTIES OF MATTER

A fundamental course covering several basic principles of physics. The divisions included are solids and their characteristics, liquids at rest and in motion, gas laws and applications. Laboratory experiments and specialized problems dealing with these topics are part of this course. Prerequisite: None.

T-PHY 102 PHYSICS: WORK, ENERGY, POWER

Major areas covered in this course are work, energy, and power. Instruction includes such topics as statics, forces, center of gravity and dynamics. Units of measurement and their applications are a vital part of this course. A practical approach is used in teaching students the use of essential mathematical formulas. Prerequisites: T-MAT 101, T-PHY 101.

T-PHY 103 PHYSICS: Electricity

Basic theories of electricity, types of electricity, methods of production, and transmission and transforming of electricity. Electron theory, electricity by chemical action, electricity by friction, electricity by magnetism, induction voltage, amperage, resistance, horsepower, wattage, and transformers are major parts of the course. Prerequisites: T-PHY 101, T-MAT 101.

T-PHY 104 PHYSICS: LIGHT AND SOUND

A survey of the concepts involving wave motion leads to a study of sound, its generation, transmission and detection. The principles of wave motion also serves as an intrduction to a study of light, illumination and the principles involved in optical instruments. Application is stressed throughout. Prerequisites: T-MAT 101, T-PHY 102.

T-PHY 106 APPLIED MECHANICS

Concepts and principles of statics and dynamics. Parallel concurrent and noncurrent force systems in coplanar and noncoplanar situations. Concepts of centroids and center of gravity, moments of inertia, fundamentals of kinetics, and kinematics of velocity and motion. Prerequisites: T-MAT 103, T-PHY 102.

PHY 1101 APPLIED SCIENCE

An introduction to physical principles and their application in industry. Topics in this course include measurement; properties of solids, liquids, and gases; basic electrical principles. Prerequisite: None.

PHY 1102 APPLIED SCIENCE

The second in a series of two courses of applied physical principles. Topics introduced in this course are heat and thermometry, and principles of force, motion, work, energy, and power. Prerequisite: PHY 1101.

T-BUS 120 ACCOUNTING

Principles, techniques and tools of accounting, for understanding of the mechanics of accounting. Collecting, summarizing, analyzing, and reporting information about service and mercantile enterprises, to include practical application of the principles learned. Prerequisite: T-MAT 110.

T-BUS 121 ACCOUNTING

Partnership and corporation accounting including a study of payrolls, federal and state taxes. Emphasis is placed on the recording, summarizing and interpreting data for management control rather than on bookkeeping skills. Accounting services are shown as they contribute to the recognition and solution of management problems. Prerequisite: T-BUS 120.

T-BUS 223 ACCOUNTING

Additional study of intermediate accounting with emphasis on investments, plant and equipment, intangible assets and deferred charges, long-term liabilities, paid-in capital, retained earnings, and special analytical processes. Prerequisite: T-BUS 222.

T-BUS 225 COST ACCOUNTING

Nature and purposes of cost accounting; accounting for direct labor, materials, and factory burden; job cost, and standard cost principles and procedures; selling and distribution cost; budgets, and executive use of cost figures. Prerequisite: T-BUS 121.

T-MAT 100 TECHNICAL MATHEMATICS

Introduction to mathematics including operations with numbers, fractions, per cent, dimensional analysis, signed numbers, elementary algebra, linear equations, basic plane and solid geometry with emphasis on applications. Prerequisite, entrance requirements.

T-MAT-101 TECHNICAL MATHEMATICS

The real number system is developed as an extension of natural numbers. Number systems of various bases are introduced. Fundamental algebraic operations, the rectangular coordinate system, as well as fundamental trigonometric concepts and operations are introduced. The application of these principles to practical problems is stressed. Prerequisite: Satisfactory evidence that admission requirements have been met.

T-MAT 102 TECHNICAL MATHEMATICS

A continuation of T-MAT 101. Advanced algebraic and trigonometric topics including quadratics, logarithms, determinants, progressions, the binomial expansion, complex numbers, solution of oblique triangles and graphs of the trigonometric functions are studied in depth. Prerequisite: T-MAT 101.

T-MAT 103 TECHNICAL MATHEMATICS

The fundamental concepts of analytical geometry, differential and integral calculus are introduced. Topics included are graphing techniques, geometric and algebraic interpretation of the derivative, differentials, rate of change, the integral and basic integration techniques. Applications of these concepts to practical situations are stressed. Prerequisite: T-MAT 102.

T-MAT 201 TECHNICAL MATHEMATICS

A continuation of T-MAT 103. More advanced concepts of differentiation and integration are considered. Included are graphs and derivatives of the trigonometric functions, exponential and logarithmic differentiation and integration, advanced integration techniques, polar equations, parametric equations and Fourier series. Prerequisite: T-MAT 103.

T-MAT 214 STATISTICS

The theory of statistics and its application in modern business. Kinds of regularity that exist among random fluctuations. Experience in associating and using mathematical models to interpret physical phenomena and predicting the outcomes of experiments related to practical business problems. Prerequisite: T-MAT 102.

MAT 1101 FUNDAMENTALS OF MATHEMATICS

Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades. Practice in depth. Prerequisite: None.

MAT 1103 GEOMETRY

Fundamental properties and definitions; plane and solid geometric figures, selected general theorems, geometric construction of lines, angles and plane figures. Dihedral angles, areas of plane figures, volumes of solids. Geometric principles are applied to shop operations. Prerequisite: None.

MAT 1104 TRIGONOMETRY

Trigonometric ratios; solving problems with right triangles, using tables, and interpolating; solution of oblique triangles using law of sines and law of cosines; graphs of the trigonometric functions; inverse functions, trigonometric equations. All topics are applied to practical problems. Prerequisites: MAT 1103.

MAT 1123 MACHINIST MATHEMATICS

Introduces gear ratio, lead screw and indexing problems with emphasis on application to the machine shop. Practical applications and problems furnish the trainee with experience in geometric propositions and trigonometric relations to shop problems; concludes with an introduction to compound angle problems. Prerequisite: MAT 1104.